Poverty Incidence in Indonesia, 1987-2002: A Utility-consistent Approach Based on a New Survey of Regional Prices

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Declaration

This thesis is my own work and contains no material which has been accepted for the award of any other degree in any other universities.

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Thesis dedication

To my late parents: *Haji* Sarminah and *Haji* Chusnan (May Allah bless you all)

'*Mak*, thank you very much for giving me and my family a permission to go to Australia. I am so sorry, I was not by your side when you went to heaven. I do hope to see you smiling in my dreams.'

To my late spiritual parent: *Aba* Jari (May Allah bless you)

'I will always miss you. You went to heaven too early'

To my daughters: Qory Zakia, Alfi Fatimah Dewi, and Ittaqi Saraswati Ulfa.

'Whatever you did today, you'll harvest later on'

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[1] This addressing was usually in the manner of encouraging the fighting-spirit of a soldier who is engaging in a battle to win a war. It can be loosely translated as "Good luck, Mate" or "Keep going, Mate", but the spirit in *"Selamat berjuang, Bung!"* is stronger than either "Good luck, Mate" or "Keep going, Mate".

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Abstract

Because the Indonesian official BPS methodology for measuring poverty lines has changed several times, and because the non-official studies do not apply unchanging methodology to all years in the period 1987-2002, it has not previously been possible to have reliable estimates as to the extent of the long-term decline in Indonesian poverty. In addition, the Ravallion method used in the non-official studies does not generate a utility consistent poverty line because it ignores changes in non-food prices. This thesis provides consistent measures of the extent of the decline in poverty over this 15 year period. It uses a utility consistent poverty line (UCPL) approach for estimating poverty lines. This approach sets poverty lines across regions and over time by means of a spatial cost of living index (SCOLI). Starting with new regional price data collected by the author, the SCOLI was constructed for each urban and rural area in each province in each Susenas year between 1987 and 2002 with rural Indonesia in 2002 as the base. The other data are the official price data. The SCOLI was scaled up with *a scaling-factor* into a poverty line for the relevant regions. To estimate the poverty incidence, this thesis picks two poverty lines corresponding to two levels of utility: an *acute* and a *mild* poverty line.

Using cumulative distributions of per capita real expenditure, this thesis demonstrates long-term trends in poverty incidence during the 15 years from 1987 to 2002 has definitely decreased, even though with a large fluctuation during that period. Poverty incidence between 1987 and 1996 steadily and remarkably diminished. For every

possible level of poverty line, including acute and mild poverty lines, poverty incidence in 1996 was far below the poverty incidence in 1987. The 1997 crisis put the 1999 poverty incidence in Indonesia back to the level of 1990. By 2002, the poverty incidence had declined from the disastrous 1999 level. However, in contrast to the officially estimated poverty incidence, this thesis argues that the decline in poverty between 1999 and 2002 failed to restore the 1996 situation.

Relative poverty is a very misleading indicator for monitoring poverty over time. Relative poverty incidences were roughly constant over time with only small fluctuations during the 15 years. Nevertheless, while small they contrasted with the patterns in absolute poverty. Furthermore, their fluctuations have been exactly the same as the fluctuations of the Gini coefficients. Relative poverty is a measure of inequality rather than a measure of poverty incidence.

Poverty in Indonesia has always been concentrated in rural areas. Accordingly, there has not been a shift in the concentration of poverty incidence from urban to rural areas in the early 1990s as is implied by the official estimates even though the proportion of urban poor to total Indonesian poor had doubled in 2002 compared with 1987. In addition, poverty incidence has been relatively high in the Eastern Indonesian islands of Nusa Tenggara, Maluku, and Papua, followed by Sulawesi. This feature holds for almost all years within the period of analysis.

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Chapter 1

Introduction

1.1. Background

Measuring poverty has received a lot of attention in the literature during the last two decades. The discussion can generally be classified into two main problems in poverty analysis: identification and aggregation. The key question in the identification problem is 'who are the poor?', while in the aggregation problem it is 'how many poor are there?' Choosing welfare indicators and setting poverty lines are the main steps used to address the first question and choosing appropriate poverty indices is the subject of discussion to deal with the second. This thesis focuses on setting poverty lines in Indonesia and its contribution is to set a single poverty line that is consistent in terms of utility level for urban and rural areas in all provinces as well as over time during the fifteen years between 1987 and 2002. This poverty line is based on a linear approximation on an expenditure function and is called a utility consistent poverty line (UCPL) approach. Accordingly, this thesis re-examines the poverty incidence for that period.

Before the crisis hit in mid 1997, Indonesia was recognized as one of the East Asian miracle countries with a high annual growth rate (World Bank 1993). This outstanding economic performance was accompanied by a marked decline in poverty incidence or the head count index (HCI, i.e., the proportion of the population whose per capita expenditure is under the poverty line) between 1987 and 1996. As can be seen from Figure 1.1 (see notes for the figure for changing methodology), the HCI estimated by the

Indonesian Board of Statistics (BPS: *Badan Pusat Statistik*) markedly declined from 17.3 per cent in 1987 to 11.3 per cent in 1996, a 35 per cent reduction relative to 1987. This is consistent with what was found in many other countries (World Bank 2000; Dollar and Kraay 2001).

Many people were concerned with poverty incidence when Indonesia unexpectedly turned out to be one of the Asian crisis/meltdown countries in mid 1997. The BPS carried out a special National Socio-economic Survey (Susenas: *Survey Sosial Ekonomi Nasional*) in 1998 to investigate the impact of the crisis on poverty incidence. This Susenas was called "Susenas type" and covered only 10 thousand households, whereas the regular Susenas in 1996 (the latest Susenas before the crisis) covered more than 60 thousand households. The regular Susenas data for estimating poverty has been collected in three-year intervals, i.e., 1984, 1987, 1990, …, 2002 (the Susenas data is explained in Section 3.6.2, Chapter 3). As the period of analysis in this thesis will be between 1987 and 2002, the term Susenas years will be used to refer 1987, 1990, 1993, 1996, 1999 and 2002.

The official HCI released in 1998 drew the attention of many scholars in this field, since the poverty lines set by the BPS to estimate the HCI were considered too high relative to poverty lines for 1996. The poverty incidence for 1998, based on this new estimate was 24.2 per cent, which was more than double that of 1996.

It eventually turned out that BPS had applied a different method to estimate the poverty line for 1998 (called "Standard 1998", see Table 5.1 BPS 1999). As pointed out by Booth (1999, p.18-19), the change in method for measuring poverty lines made discussion on the impact of the crisis on poverty incidence more confusing. Eventually, BPS released new (revised) poverty lines for 1996 using "standard 1998" in order to make the poverty lines for 1996 and 1998 comparable.

Based on BPS (1999; 2003c), the reported official poverty incidence estimates have been methodologically inconsistent over time, since five different methods for estimating poverty lines have been used. This thesis will refer to these different methods as: BPS-1, which applied up until 1990; BPS-2; BPS-3; BPS-4; and BPS-5, which applied to 1993, 1996, 1999, and 2002, respectively.[1] The BPS-4 method here corresponds to "standard 1998", which means the revised poverty incidence for 1996 corresponds to the BPS-4 method and the original poverty incidence for 1996 corresponded to BPS-3. All of these official BPS measures use 2100 calories per capita per day, but they differ both in how they allow for variations in the cost of calories - some foods are much more expensive calorie sources than others - and also in how they allow for the cost of non-food items in the expenditure needed to reach the poverty line.

Figure 1.1 shows both the official HCIs and the HCIs estimated by other researchers. The solid lines between the two consecutives estimates indicate they are based on the same method. Only two pairs of official HCIs are methodologically consistent, i.e., the HCIs for 1987 and 1990 labelled as BPS-1, and the HCIs for 1996 and 1999 labelled as BPS-4. To aid in comparing the official HCIs throughout the period 1987 to 2002 and

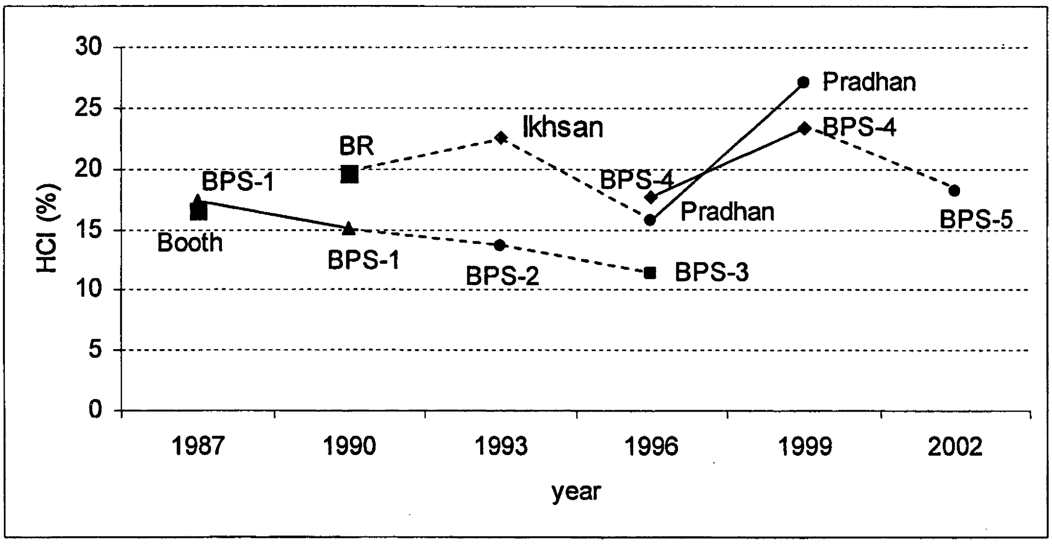
[1] The numeric symbol following the BPS acronym indicates the BPS method in chronological order. This naming is chosen by the author to distinguish between one official method and another.

assuming the difference in methodology between BPS-1, BPS-2, and BPS-3 and between BPS-4 and BPS-5 can be ignored, the broken lines are used to link these methodologically similar HCIs. Other similar HCIs are those estimated by Bidani and Ravallion (1993) for 1990, Ikhsan (1999) for 1993, and Pradhan et al. (2000) for 1996 and 1999, which are all based on the Ravallion lower poverty line (LPL) method. However, the chosen reference population – defined as the part of population chosen to represent the poor from which the food poverty lines are estimated – applied by each study was determined differently.[2] Assuming the differences in the chosen reference population can be ignored, HCIs estimated by the three studies were connected with broken lines.

As can be seen from Figure 1.1, the most striking concerns about the inconsistency of the official method is between the BPS-3 and BPS-4 methods (not connected with a line). The difference between the old HCI (based on BPS-3) and the revised HCI (based on BPS-4) was substantial. The revised HCI for 1996 was 17.5 per cent, 1.55 times higher than the old HCI, 11.3 per cent. The revised HCI was even higher than the 1987 BPS published HCI of 17.4 per cent.

[2] Bidani and Ravallion used the lowest 15 per cent and Ikhsan used the lowest 35 per cent of nominal per capita expenditure in the related Susenas, while Pradhan et al applied an iterative method to determine the reference population. As different reference population could result in different consumption pattern, it most likely that the estimated food poverty lines (and the poverty lines) generated by one study are not fully comparable with another. For this reason, the HCIs labelled with 'BR', 'Ikhsan', and 'Pradhan' are not connected with a solid line, but with a broken line.

Figure 1.1: Official estimates and selected other studies' estimates on poverty incidence in Indonesia from 1987 to 2002



Notes: Booth is a population weighted average (calculated by the author) of urban and rural HCI estimated by Booth (1992); BR is the HCI estimated by Bidani and Ravallion (1993); Ikhsan is the HCI estimated by Ikhsan (1999); Pradhan is the HCI estimated by Pradhan et al. (2000); and BPS-1,…,BPS-5 are official HCIs published by BPS (1999; 2003c) indicating five different methods. To aid evaluation of the official estimates, those that are roughly but not fully comparable have been connected by broken lines. The big change in the BPS estimates was between BPS-3 and BPS-4 in 1996. The HCIs labelled "BR", "Ikhsan", and "Pradhan" are all based on the Ravallion lower poverty line method, but each was applied to a different reference population—that is the part of population chosen to represent the poor for the purpose of estimating the food poverty line. As mentioned in footnote 2, Bidani and Ravallion used the poorest 15 per cent and Ikhsan used the poorest 35 per cent of the population ranked by nominal per capita expenditure in the related Susenas. Pradhan et al. applied an iterative method to determine the reference population. Because of these minor differences, these studies are connected with broken lines. Ikhsan (1999) actually calculated both lower and upper poverty lines, but the HCI shown in the figure was based on the LPL.

Source: As indicated in the notes.

Accordingly, basic questions in poverty analysis, such as 'Did poverty diminish from 1987 to 2002?' cannot be easily answered from the official HCIs. As shown in Figure 1.1, the official HCIs are able to answer the trend from 1987 to 1996 (with a caveat of changes in methodology). They are also able to show that poverty incidence jumped from 1996 to 1999 before declining again by 2002 roughly to the level of 1996. However, the figure does not provide enough information to answer the question. It is apparent from the figure that the two distinct HCIs for 1996 makes such trend analysis difficult. To evaluate trends, it is necessary to estimate what would have been the poverty incidence between 1987 and 1993 if the poverty line had been estimated using a single method (e.g., the BPS-4 or BPS-5 method). Furthermore, the alternative estimates of HCI applying the Ravallion LPL method give different pictures of the trend in poverty incidence between 1987 and 1996. With the assumption that the difference in the reference population can be ignored, the poverty incidence actually rose between 1990 and 1993, before falling again by 1996. Therefore, the trend of poverty incidence during that period is not clear.

In addition to changes in methodology over time, it has been widely argued that the official BPS estimates generate urban poverty lines which are too high relative to rural poverty lines (Ravallion and van de Walle 1991; Bidani and Ravallion 1993; Asra 1999; Ikhsan 1999; Pradhan et al. 2000). In this thesis, the term 'U-R COL gap' is used to indicate the excess percentage of urban cost of living (COL) over rural areas COL. The official BPS poverty lines for 1990 imply the population weighted average U-R COL gap was 55 per cent. In contrast, Bidani and Ravallion (1993) estimated it was only 18 per cent. As a result, the HCI in rural areas in 1990 was not *lower* than in urban areas as indicated by the official method, but according to Bidani and Ravallion was actually substantially *higher* than urban poverty incidence. This finding suggests the BPS figure was misleading for poverty alleviation programs.

Bidani and Ravallion (1993, p.40) also argued there was an upward bias in the official poverty lines in richer regions, relative to poorer regions. Their criticism is that the food bundle used in the BPS poverty line was not held constant but used relatively expensive sources of calories in relatively rich regions and relatively cheap sources of calories in relatively poor regions. (This will be detailed in Chapter 3). While the criticism made by Bidani and Ravallion was about the official method applied in 1990 (i.e., BPS-1), the consumption bundle in the later official methods (up to BPS-5) continued to vary across the regions being compared. Accordingly, the point made by Bidani and Ravallion is still valid.

The Bidani and Ravallion study applied the Ravallion lower poverty line method (Ravallion 1992), based on Rowntree's basic needs approach (1902). Ravallion (1992) proposes two poverty lines, namely a lower poverty line (LPL) and an upper poverty line (UPL). Apart from Bidani and Ravallion, most other poverty studies in Indonesia during the 1990s have also applied a LPL, such as Ravallion and Bidani (1994), Pradhan et al. (2000; 2001), and Suryahadi et al. (2000; 2003). However, Ikhsan (1999) applied both a LPL and an UPL. The attractiveness of both the LPL and UPL is that they do not require data on non-food prices and their implementation is relatively easy. They only require the regional price data on food items (to estimate regional food poverty lines) and the food shares (to adjust the food poverty lines to get the poverty lines). The food shares are estimated through a regression of an Engel equation.

The credit for the Ravallion LPL method, as reflected in Bidani and Ravallion (1993, p.42), is in proposing a method for estimating poverty lines generating a more consistent regional poverty profile than the official BPS method. However, this method also has problems of inconsistency due to the indirect method used for estimating non-food poverty lines. According to Kakwani (2001, p.14; 2003, p.17), consistent regional comparisons must have the value of the relevant food and non-food price indices. The regression method alone cannot solve the problem of making consistent regional poverty line comparisons. As explained in Chapter 3 and as shown by the empirical finding in Chapter 5, the Ravallion LPL and UPL overestimate a utility consistent poverty line in regions with high food to non-food prices relative to regions with lower food to non-food prices. They also overestimate the poverty incidence for these regions by 2-3 percentage points compared to the UCPL estimates. The Ravallion LPL and UPL ignore the variations in non-food prices. Therefore, it is not surprising that, assuming no change in food share, the change in poverty lines over time was determined solely by food inflation rates (see also, Suryahadi et al. 2000, p. 16; Suryahadi et al. 2003, p. 234).

Two papers estimating Indonesian poverty incidence by region and for the whole country over relatively long time periods were published recently. Lokshin and Ravallion (2005) updated the poverty lines for 1990 estimated by Bidani and Ravallion (1993) to estimate regional poverty incidence up to 2002 according to the price changes within the related province. Likewise, based on the poverty lines for 1996 developed by

Pradhan et al. (2000) and price changes specific to each province, Suryahadi et al. (2006) calculated regional poverty incidence from 1984 to 2002. Bidani and Ravallion's poverty lines for 1990 and Pradhan et al's poverty lines for 1996 are both based on the Ravallion LPL method. The theoretical arguments of Chapter 3, supported by the empirical evidence reported in Chapter 5, show that this method—that is, the Ravallion LPL—tends to overestimate the UCPL in regions and periods in which food prices are relatively high and to underestimate it in regions and periods in which food prices are relatively low. This means that the base year poverty lines (1990 for Lokshin and Ravallion and 1996 for Suryahadi et al.) are *not* utility consistent. Nevertheless, both studies then used the UCPL approach to update these base year poverty lines to more recent years.

In addition to the above difference in methodology between this thesis and the studies of Ravallion and Lokshin (2005) and Suryahadi et al. (2006), there is a substantial difference in the data used for estimating price changes. All three studies use a single CPI for both urban and rural areas in each province, but this thesis bases the provincial CPI on an average of price changes in urban and rural areas in each province (see Chapter 6). In contrast, the other two studies use the official CPI by province reported by BPS, which actually reflects urban price changes only. Ravallion and Lokshin re-weighted four components of this official CPI (namely, food, clothing, housing, and miscellaneous) to generate a new version of the provincial CPI. A similar method and data were also applied by Suryahadi et al. (2006).

The poverty incidence estimated in these two studies differs quite substantially from the

UCPL estimates used in this thesis. In across region comparisons, the Ravallion LPL generates quite large biases in estimated poverty incidence in some regions compared to the UCPL, although the ranking of provinces based on the two approaches is similar. In over time comparisons, the changes in estimated provincial CPI (and poverty lines) in both the Ravallion and Lokshin study and the Suryahadi et al. study are lower than the changes in estimated provincial CPI in this thesis. As a result, the long term decrease in poverty incidence in these two studies is larger than the decrease estimated in this thesis.

1.2. The objectives of the study

Two points can be emphasized from the discussion in the previous section. Firstly, no studies have used a single method for estimating poverty incidence in Indonesia over the fifteen years under study (1987 to 2002). Therefore, it has not previously been possible to have reliable estimates as to the extent of the long-term decline in Indonesian poverty. On the one hand, the official poverty incidence estimates have been based on inconsistent methods over time. Moreover, they also suffer from inconsistency problems across regions, as argued by Bidani and Ravallion. On the other hand, the alternative estimates seem to indicate a fluctuation in poverty incidence between 1987 and 1996. Secondly, the alternative method (i.e., the Ravallion LPL) that proposes a better tool to estimate poverty lines across regions, cannot resolve the problems. It also suffers from inconsistency both for across regions and over time comparisons.

This thesis will re-examine poverty incidence in Indonesia using a single method applied to all Susenas years from 1987 to 2002. The method proposed is a utility consistent poverty line (UCPL) approach, which is based on a linear approximation of an expenditure function. The poverty line is defined as the minimum expenditure needed to attain a constant (chosen) level of utility at existing market prices. The chosen level of utility is arbitrary, but once a utility level has been picked, it has to be fixed across regions and over time. This thesis picks two levels of utility, namely a lower level of utility - $\underline{u}$ -, which corresponds to an acute poverty line; and an upper level of utility - $\overline{u}$, which corresponds to a mild poverty line.

Setting two levels of utility (poverty lines) can also be used to handle the weaknesses of HCI as a measure of poverty. As will be explained in Section 2.4 of Chapter 2, transferring money from a very poor person to an individual just below the poverty line (i.e., one who will be non-poor after receiving the transfer) reduces the HCI, although most people would agree that it makes poverty more serious than before the transfer. To facilitate comparisons with the official estimates, $\underline{u}$ (or an acute poverty line) is set at a level that equates the HCI based on the UCPL with the official HCI at the national level in 2002; and $\overline{u}$ (or a mild poverty line) is set at 1.5 times the acute poverty line.

In this approach, the difference in poverty lines across regions and over time (for a given region) is solely based on the price differentials across domain comparisons. The UCPL approach needs two types of price indices: a price index across regions for a given year (Spatial Cost of Living Index, SCOLI); and an over time price index (Consumer Price Index - CPI) for a given region. The SCOLI is the same thing as a consumer price index (CPI). For convenience, the term SCOLI is used to refer price variations across regions and CPI is used to refer to price variations over time.

The problems faced in applying this method are that there are no readily available official data for SCOLI in Indonesia. The author constructed the SCOLI for each region (urban and rural areas in each province) for each Susenas year from 1987 to 2002.

1.2.1. Constructing the SCOLI

1.2.1.1. SCOLI for 2002

The reported individual prices by BPS for 2002 (BPS 2003a) could be used for constructing the SCOLI. However, the prices were not used for two reasons. Firstly, the prices of almost half of the 49 selected items included in the consumption bundle to construct the SCOLI have not been reported by BPS for rural areas. Secondly, the prices reported by BPS indicate a poor comparability across urban and rural areas. This will be detailed in Section 4.2 of Chapter 4. As noted in the preface of the publication (BPS 1997a), the BPS reported price data cannot be directly compared across regions due to quality differences across cities. This problem was already pointed out three decades ago by Arndt and Sundrum (1975). The incomparability might be due to the fact that the BPS reported prices have been designed to estimate the CPI for a given region rather than to estimate price differences across regions at one point in time.

Accordingly, in order to estimate the SCOLI for 2002 the author carried out a special survey to collect the prices of selected 31 food items and 18 non-food items[3] (49 items

[3] Note that nothing is special about food and non-food in the UCPL method. The listing of food and non-food in the consumption bundle is to simplify the items and to make a bridge between this method and other methods applied by other researchers.

in total) derived from the consumption pattern of the *nationally* lowest 30 per cent nominal per capita expenditure in Susenas 2002. The survey was carried out in traditional markets in both urban and rural areas and was conducted in ten provinces chosen for two reasons. Firstly, almost 75 per cent of Indonesia's poor in 2002 lived in these ten provinces, as shown by the official data (BPS 2003e). Secondly, time-series data on rural prices were reported by BPS (1997b; 2003d) for these provinces. This means a comparison of the urban CPI and rural CPI can be made for the surveyed provinces. The urban CPI and rural CPI were needed to construct the ***provincial CPI*** for each province, which in turn was used to construct the SCOLI for each of the earlier Susenas years from the SCOLI in 2002 through backcasting.

Based on this special price survey, the author calculated the SCOLI for urban and rural areas in the ten surveyed provinces. The SCOLI for non-surveyed provinces was estimated at the level of the SCOLI for the neighbouring surveyed provinces corrected by the BPS estimates of the relative price of *urban food prices* in non-surveyed provinces to *urban food prices* in neighbouring surveyed provinces. For example, the SCOLI for *urban* Aceh (a non-surveyed province) was estimated at 0.984 of the SCOLI for *urban* North Sumatra (a surveyed province), since the ratio of *urban food prices* in Aceh to those in North Sumatra was estimated at the level of 0.984 according to the BPS data. Likewise, the SCOLI for *rural* Aceh was also estimated at the level of 0.984 of SCOLI for *rural* North Sumatra. The *urban food prices* were estimated based on the author's food bundle (31 food items) and BPS reported individual prices for urban areas, such as the price of rice, cassava, beef, and so on. *Rural prices* were not estimated due to the lack of BPS reported prices for rural areas and only *food prices* were estimated because comparability across regions is better than the comparability for non-food prices.

1.2.1.2. SCOLI for earlier Susenas years

To estimate the SCOLI for earlier Susenas year (i.e., 1987, 1990, ..., 1999) in each region, an inflation estimate was needed. Accordingly, the author constructed a ***provincial CPI*** for each province using BPS reported prices for individual items. These prices are actual prices measured in Rupiah per physical unit, e.g., Rp/t-shirt or Rp/kg of rice and so forth. As mentioned, the SCOLI for earlier Susenas years was estimated through backcasting. The details of the backcasting are given in Chapter 6.

1.2.2. The specific objectives of the study

Following the steps in applying the UCPL approach, the specific objectives of this thesis are as follows:

1. To construct a SCOLI for each region (urban and rural in all 26 provinces) in 2002, to investigate the size of the U-R COL gap in Indonesia in that year and to compare it with the official and other researchers' estimates.

2. To investigate empirically any systematic bias in the Ravallion LPL and UPL methods.

3. To construct a SCOLI for earlier Susenas years from 1987 to 1999 through backcasting SCOLI for 2002. A ***provincial CPI*** was constructed for relevant provinces and years.

4. To re-examine the trend in poverty incidence in Indonesia from 1987 to 2002, and analyse the distribution of poverty incidence across various category areas, such as urban and rural, islands, provinces, Western and Eastern Indonesia. Also to analyse the contribution of changes in poverty each area towards the change in poverty in Indonesia.

5. To analyse the rise and fall of poverty incidence during the crisis period.

1.3. Organization of the thesis

The remainder of this thesis is organized as follows. Chapter 2 reviews the steps used to measure poverty in general. This involves choosing welfare indicators, poverty lines, and the poverty measure. Discussion of welfare indicators begins with a review of some possible welfare indicators potentially used to estimate poverty in general. This section also discusses the advantage of using expenditure over income data. The main idea put forward in the poverty line discussion is that the poverty line is somewhat arbitrary, so that the focus of the discussion of setting poverty line should not be how to measure the exact poverty line, but on estimating consistent poverty lines across the regions. The use of the Foster, Greer, and Thorbecke (FGT) index is the focus in the poverty measure section. This chapter also provides discussion on the Atkinson's dominance theory that makes poverty incidence comparisons possible without first estimating poverty lines.

Chapter 3 sets out the UCPL approach underlining that the poverty lines are an expenditure function evaluated at existing price levels and a certain utility level. It shows the effect of price changes to a new expenditure level is best approximated by a Laspeyres price index. This is the basic idea of the UCPL. Based on this concept, the chapter reviews the selected methods that have been applied to estimate poverty lines in Indonesia. The step-by-step methodology used in this thesis (methodology for the rest of the chapters) is presented in this chapter. However, where necessary, some parts of the methods will be presented again in the relevant sections of the following chapters.

Chapter 4 presents the estimated SCOLI for 2002, beginning with the reasons why the author needed a special price survey to construct the SCOLI for 2002. A description follows on the problems facing SCOLI construction and the strategies taken to deal with them. After presenting the U-R COL gap in the ten surveyed provinces based on the UCPL approach, and comparing this with the one based on the official and other researchers' poverty lines, this chapter demonstrates why the official poverty lines have overestimated the size of the U-R COL gap. The SCOLI for the urban and rural areas in all provinces is also presented in this chapter.

Chapter 5 estimates the U-R COL gap for urban and rural areas in these ten provinces in 2002, using both the UCPL and Ravallion LPL and UPL methods and provides empirical evidence that the Ravallion LPL and UPL methods are upward biased towards regions with more expensive foods relative to regions with low price foods. In addition, this chapter confirms what was found in Chapter 4: the U-R COL gap based on the LPL and UPL for 2002 was much lower than the official estimates and roughly equal to the ones based on studies using the Ravallion LPL method for 1990, 1996, and 1999.

Chapter 6 presents the SCOLI results for all Susenas years: 1987, 1990, …, 2002. This chapter begins by explaining the process of backcasting SCOLI. Starting with the SCOLI for 2002, the backcasting was firstly made to get a SCOLI for 1999. Then, the

SCOLI for 1999 was backcast to get a SCOLI for 1996, and so forth, back to 1987. Two sets of SCOLI are reported in this chapter: the SCOLI derived using Susenas weights and BPS data on prices of individual items (SCOLI-A) and one derived using official urban and rural CPI (SCOLI-B). This chapter proceeds to explain the discrepancies between the two SCOLI.

Chapter 7 reports the UCPL estimates of the *direction* and *magnitude* of the change in poverty incidence from 1987 to 2002. In accordance with the dominance theory of Chapter 2, the cumulative distribution of real per capita expenditure is used to give *the direction* of the trend in poverty over time. Given the arbitrariness of any one poverty line, this chapter sets two poverty lines to examine the *magnitude* of the change in poverty incidence: an acute poverty line and a mild poverty line as defined in the previous section. The *direction* and the *magnitude* of the trend in poverty incidence are based on both the SCOLI-A and SCOLI-B. This chapter also demonstrates why relative poverty measures are very misleading indicators for monitoring poverty over time. This is followed by investigating the distribution of the poor across urban-rural areas, across islands, and across provinces. To show the contribution of each area and population shift to the total decline (increase) in poverty, a poverty incidence decomposition by each area and population shift is carried out. Decomposition by sector of production (i.e., where the household head is employed) from 1996 onward is also carried out to see the contribution of each sector to the rise and fall of poverty incidence during and after the crisis.

Chapter 8 summarizes the main findings and outlines the limitations of this study. It also offers direction for some potential future research.

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Chapter 2

The Main Approaches to Poverty Measurement

2.1. Introduction

This chapter highlights the main aspects within the three steps of poverty measurement, i.e., choosing a welfare indicator, a poverty line concept, and poverty measures (indices). This chapter underlines the advantages of using expenditure over income for measuring welfare levels in the first step, and points out that the use of per capita expenditure is still appropriate to incorporate household size into the poverty measurement. For the second step, this chapter highlights the importance of using an absolute poverty line rather than relative poverty to describe the progress in poverty alleviation programs. It also highlights the arbitrariness of poverty lines. The more relevant problem is to generate consistent poverty lines across regions and over time rather than measuring an 'exact' poverty line. In the final step of poverty measurement, this chapter adopts the Foster-Greer-Thorbecke (FGT) poverty indices as useful guides to poverty alleviation programs. Lastly, this chapter notes that it is possible to compare poverty across regions and over time without applying either a poverty line or a poverty index by applying the Atkinson's stochastic dominance theory. While this approach is not fully adopted in this thesis, the idea of this theory is applied by setting two poverty lines: an acute poverty line and a mild poverty line. This theory is also used to summarize poverty comparisons over time and across regions.

This chapter consists of 6 sections. Following the introduction, Section 2.2 is concerned with welfare indicators and the advantages of the use of expenditure over income. Section 2.3 highlights the development of the main views on poverty lines. One sub-section is devoted to underlining the reasons for absolute poverty and the other sub-section discusses the arbitrariness of any single poverty line. Discussion of poverty indices is in Section 2.4. Section 2.5 looks at situation where poverty incidence comparisons can be made without a poverty line and without poverty indices. Section 2.6 summaries and concludes.

2.2. Welfare indicators

This section discusses welfare indicators and sets out the advantages of using expenditure rather than income to indicate the level of welfare. It also argues for the use of per capita expenditure to incorporate household size in poverty measurements as still appropriate.

2.2.1. Expenditure and Income

There is no a perfect single yardstick to measure welfare. While there are plenty of indicators used to measure welfare, such as income per capita, life expectancy, illiteracy rate, mortality rate, and so forth, it is not uncommon for income per capita to be used as a first single indicator. For example, The World Bank has used income per capita to classify countries as can be seen in the World Development Reports. Other economic as well as social indicators are also used by The World Bank to supplement income per capita to get a better picture for comparisons.

Both income and expenditure measures have been widely used in poverty studies. Simplicity and practical use could be the main reasons for measuring poverty in terms of money, i.e., expenditure or income (see for example, van Praag and Baye 1990). It is easy to sum all sources of income or sum all kinds of expenditure to a single number. This is not the case when using social indicators, such as education level, life expectancy, health status, shelter conditions, illiteracy rate, and so forth. The reason is that the correlation among these indicators may not be strong enough that one indicator can adequately represent the others. Just because an individual has adequate shelter does not mean he or she necessarily has good health status. Transforming the social indicators into a composite index, such as the Human Poverty Index (HPI)[1] of UNDP (1997) is one solution. However, there is no adequate theory underlying such aggregation (Deaton 1997, p.149). How each indicator should be weighted is inevitably arbitrary. Furthermore, once the index number has been calculated, its meaning is unclear and, more importantly, it is far more interesting to have information on these indicators separately rather than as index numbers (Ravallion 1996, p. 1333). As has been argued by The World Bank (1990b), as long as income and expenditure includes household own production, they are very useful yardsticks for measuring living standards.

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[1] UNDP constructs this index to make a poverty comparison across countries. The HPI is a composite index comprising three elements. The first is related to longevity and the second to knowledge. The third relates to living standards, which is further broken down into three indicators, i.e., percentage of people without access to safe water, percentage of people without access to health services, and percentage of moderately and severely underweight children under five years old. Therefore, for example, a HPI of 25 per cent means an average of some 25 per cent of the population is affected by human poverty or deficiency of all indicators included. This does not reveal anything about how many people are poor, or where they live (see Chapter 1 of the report and its technical note).

There has been ongoing debate as to which is the more appropriate indicator to be used between income and expenditure. On a conceptual basis, the standard argument for the expenditure indicator is that consumption is a better measure of lifetime welfare than current income. There are two stylized facts that support the stability of consumption as shown in the consumption function literature (Deaton 1992, p.76). First, consumption is smoother than income, which can be explained by the permanent income hypothesis. Second, only in the long run will consumption be proportional to income.

Empirical evidence on consumption smoothing in poor countries has shown households are able to smooth consumption against seasonal or yearly fluctuations in income (Deaton 1997, p.394). This evidence implies expenditure is likely to be a better indicator of welfare at any one point in time than income. On a practical basis, income is more vulnerable to measurement errors due to the difficulties in collecting data, especially for rural households where income is largely from self-employment in the agricultural sector. It has also been recognized that income errors are larger than expenditure measurement errors (Paxson 1992, p. 19). From a household perspective, it is easier to recall expenditure than income. All Indonesian poverty studies have used expenditure data and this thesis follows this accepted practice.

2.2.2. Per capita expenditure

The expenditure data is collected through a household expenditure survey to determine expenditure at the household level, rather than the individual level at which poverty is measured. The per capita expenditure is then calculated by dividing household total expenditure by household size. In this thesis, the per capita expenditure is used as a basis for poverty measures to incorporate household size.

There has been an alternative way to incorporate household size, i.e., equivalent scale. The idea is that an adult man's calorie requirement is different to that of an adult woman, and a child's calorie requirement is different to that of an adult. An equivalent scale has been regarded as a better method of taking household size into account. Several procedures have been proposed, such as the Engel and Rothbarth methods (Deaton and Muellbauer 1980; Deaton 1997). However, according to Deaton (1997, p.150), there is still no preferred procedure for taking an equivalence scale into account and the use of household per capita expenditure assigned to individuals is still the best practice. Accordingly, this thesis adheres to the common practice of adjusting for household size through per capita expenditure. Balisacan (2001) used the same argument for poverty measurement in The Philippines.

2.3. Poverty line concepts

This section highlights the development of the main views on poverty lines and underlines the reasons for choosing an absolute poverty line, rather than using relative poverty. In addition, it highlights the arbitrariness of using any one poverty line.

Rowntree (1902) - who studied the incidence of poverty in York more than 100 years ago (1901) and is generally regarded as the pioneer in poverty measurement[2] - defined

[2] His study has been cited elsewhere (see for example, Orshansky 1965; Coates and Silburn 1970; Atkinson 1976; Townsend 1979; Sen 1981; Donnison 1982; Ravallion 1992). His study was the basis for social security programs for the poor in England and was adopted by the US government for the same purpose. His study was also the basis for recommending minimum social security rates and minimum

poverty in absolute terms as not having sufficient income to obtain the minimum necessities, such as food, housing rental, and household sundries (such as clothing, light, fuel, etc). In relation to food, he referred to nutritional aspects, such as protein, fats and carbohydrates (Rowntree, Ch. 4). The minimum food requirement was to generate a fair work capacity and based on dietary standards recommended by nutrition experts. Following the work of Rowntree, poverty measurement in the early literature was also an absolute concept. Orshansky (1965; 1969) admitted that although there was not one standard universally accepted way to draw the line between poor and non-poor, it was not impossible to arrive at an agreement of 'how much is enough' or at least at 'how much is too little'.

Absolute poverty implies all individuals on the poverty line should have the same standard of living irrespective of individual circumstance (Kakwani 2003). Accordingly, poverty lines are fixed in real terms across regions and over time. Any differences in poverty lines across regions and over time are usually only attributed to price differences, although in principle, differences in age, health, gender or climate could also be relevant.

As the income levels of populations have increased during the last century, the absolute poverty concept was challenged and poverty lines defined many decades ago have come to be regarded as irrelevant. It has been argued by some researchers that poverty should be a relative concept and being poor should be viewed in relative terms to be able to be defined objectively and applied consistently. Townsend (1979, p.31), for example,

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earnings in many countries, including South Africa, Canada, and (then) Tanganyika (before the emergence of Tanzania) (Townsend 1979, p.33-34).

insisted poverty must be viewed as a relative concept. The same view was made by Atkinson (1976, p.186) saying poverty 'is necessarily defined in relation to social conventions and the contemporary living standards of a particular society, and in this way somebody in the United States may be adjudged poor even though he has a higher income than the average person in India'. The same view was found in Esmara (1986, ch.9) saying consumption patterns vary across rural and urban areas and also over time. He insists these variations reveal what constitutes basic needs and should therefore be incorporated into the poverty line concept.

The position adopted in this thesis is that the poverty line of most interest to any particular country, or period, should be chosen relative to the circumstances of that country, or period. Nevertheless in making comparisons, the poverty line should be an absolute line that stays constant in real terms. The poverty line of interest to the USA should be set higher than the one of interest to Indonesia. While measured poverty incidence may then be higher in the USA than in Indonesia, this does not matter for comparisons over time in either country. However, it would be highly misleading to report poverty incidence in the USA was higher than in Indonesia if the use of any common poverty line showed the opposite.

A relative poverty line is obtained by defining the poor as those with expenditure less than some specified proportion (for example, half) of the median expenditure. This kind of measure has been widely used in European countries (see Table 1 of Atkinson 1991). In this sense, poverty can always exist in a society and a poor individual in this definition could be better off than one defined as poor under absolute poverty. The relative concept is elastic to the level of welfare, while the concept of absolute poverty is inelastic to the welfare level.

Nevertheless, the debate has not yet ended as the recent literature on poverty offers a third possibility. This is the idea that poverty should be based on the perception of individuals themselves, rather than on a researcher's perception of poverty (Goedhart et al. 1977; van Praag et al. 1982; Hagenaars and van Praag 1985; Pradhan and Ravallion 1999). In this view, whether an individual belongs in a poverty category depends on their perception of their welfare based on their own judgment. This concept - named after the researcher's place of origin - is known as the Leyden Poverty Line concept. The typical survey design of this concept is that respondents are asked whether their consumption of commodities, such as goods, housing, clothing, and other indicators are sufficient for their family's needs. The Leyden approach is not followed in this thesis.

The approach taken in this thesis is to define the poverty line in terms of the minimum expenditure function with utility set at u^0, where this is the level of utility below which people are classified as 'poor' and above which they are classified as 'non-poor':

2.1 $$PL \equiv z = e(p, u^0)$$

In other words, the poverty line is the minimum expenditure level to achieve the chosen level of utility at prevailing price levels. In this sense, the minimal expenditure level in Indonesia at 2002 prices might correspond to Rp 100 thousand per capita per month. However, the choice of the level of utility - u^0 - (and thus, this particular amount) or any other is arbitrary. This is referred as a utility consistent poverty line (UCPL) approach. (This will be detailed in Chapter 3).

The approach taken in this thesis is to pick two levels of utility (corresponding to two absolute poverty lines), i.e., $\underline{u}$: 'extreme' or 'acute' poverty and $\bar{u}$: 'moderate' or 'mild' poverty and both of which are fairly arbitrary. The former corresponds to an acute poverty line and the latter to a mild poverty line. Although the absolute levels of both lines are arbitrary, a very careful attempt is made to ensure that, as far as possible, the poverty lines are kept constant (in terms of the level of utility) in comparisons across regions and over time.

2.3.1. Absolute and Relative poverty lines

This sub-section underlines the reasons for choosing an absolute poverty line.

The choice of poverty concept does matter to poverty incidence. Consider two regions A and B and assume per capita expenditure in the two regions has the distribution as in Table 2.1. It is easy to see from the table, that the level of welfare in Region B is higher than in Region A. The median expenditure in B is more than double that in A. The median will be Rp105 for Region A and Rp 220 for Region B. If the poverty line is determined at a fixed level (i.e., the absolute poverty concept), of Rp100 for both regions, the number of poor in Region A will be 3 out of 10 persons, with no poor in Region B. This means the head count index (HCI, i.e., proportion of population below poverty line) in Region A is 30 per cent while in B it is zero per cent, reflecting a lower poverty incidence compared to the former. However, if the poverty line is defined as half of median expenditure (i.e., the relative poverty concept) the incidence of poverty in the two regions will be totally different. The poverty lines will be Rp 52.5 and Rp 110 for Region A and B, respectively. The HCI in the first region will drop to 10 per cent and in second region increase to 20 per cent. So, poverty incidences are sensitive to the choice of poverty line. Therefore, the role of a poverty line in poverty measurement is crucial.

Table 2.1: Examples of poverty concept choice impacts on poverty incidence

	Real per capita expenditure Region A and B (Rp 000)										HCI If PL=100	HCI if PL=50% median
Region A	50	90	95	105	105	105	105	105	110	110	30%	10%
Region B	105	105	150	220	220	220	220	250	250	250	0%	20%

Notes: The columns corresponding to individuals. There are 10 individuals in each region. They are ranked by increasing real expenditure.

One objection to relative poverty measures is that they are potentially highly misleading. For example, if some event raises everyone's real income, but raises median real income by more (in proportionate terms) than the real income of those with less than half the median income, it will raise poverty, even though every poor person has been made better off.

Two distributions of real per capita expenditure (PCE) for Indonesia in 1996 and 1999, i.e., pre and post crisis, exactly describe the above situation, but in the opposite direction. If relative poverty (for example, defined as half of median PCE) has been used, poverty incidence would have decreased between the two years. The median real PCE in 1999 was Rp 140.5 thousand and lower than in 1996 at Rp 171.9 thousand per month. This means the relative poverty line in 1999 was Rp 70.2, lower than in 1996, i.e., Rp 86.0 thousand per month. Accordingly, poverty incidence would be shown to have decreased from 5.8 per cent in 1996 to 4.3 per cent in 1999 even though poverty incidence in 1999 was undoubtedly substantially higher than in 1996. (This will be detailed in Chapter 7).

A second objection to relative poverty measures is that they confuse poverty with inequality. Both (absolute) poverty and inequality are important concepts that need to be measured, but measuring relative poverty and referring to it simply as poverty confuses the two quite distinct concepts. Relative poverty is actually an inequality concept. As will be shown in Chapter 7, the pattern of the change in relative poverty in Indonesia during 15 years from 1987 to 2002 has been similar to the pattern of the change in inequality as indicated by Gini coefficients.

2.3.2. The arbitrariness of poverty lines

This section is devoted to reviewing the notion that poverty lines under an absolute poverty concept are somewhat arbitrary.

There are some critical issues in the minimum necessities relating to poverty definition, such as the cut-off for the minimal requirement of nutrition intake. There has been no consensus as to how many calories should be regarded as the minimum. For example, the consensus for the minimum energy requirement in Indonesia has been 2100 calories per capita per day regardless of where the person lives, their age, gender, or occupation. However, Rao of the World Bank (1990a) used 2,150 calories for a poverty study in Indonesia in the 1980s. Bangladesh uses 2,122 (Wodon 1997); India uses 2,435 calories for rural and 2,095 for urban areas; and Thailand uses 2100 to 2787 calories depending on ages and sex (see, Kakwani 2003, p.11). This variability of calorie requirements in India and Thailand reflects the notion that, on average, rural people need more energy than urban people because they do more physically demanding work. Males, on average, need more energy than females for similar reasons.

The second issue is how to translate the minimum nutritional requirements to a minimum food requirement. Consumption patterns can vary by region. Therefore, the minimum requirement of nutrition intake based on these consumption patterns could end up in different kind of foods corresponding to these patterns. Clearly, there could be a lot of food combinations that satisfy the same minimal nutrition requirement. This raises the issue of which consumption patterns should be chosen. The third issue is even more difficult. This is to specify the minimum requirement for non-food items.

These critical issues reflect the arbitrariness of any poverty line. The determination of 'how much is enough' in terms of energy requirement, the choice of the kinds of food from the consumption patterns of the society and the choice of what is the minimum quantity of each food, are based on consensus and therefore are more or less arbitrary. Nevertheless, the reasons for choosing what and how much of 'essential' food items are better grounded empirically than for non-food items. For example, Rowtree's food basic needs were based on studies carried out by nutrition experts. However, there is no clear basis for determining what and how much of non-food items should be regarded as 'basic needs'.

The arbitrariness of the poverty lines has been pointed out by many researchers. Among them are Orshansky (1965, p.4), Watts (1967, p.3), Esmara (1986, p.291), Chakravarty (1990, p.205), Ravallion and Bidani (1994, p.78), and Deaton (1997, p.141-143). A strong impression of this arbitrariness can be seen in Hagenaars and de Vos (1988).

They did a survey of the definition of poverty and analyzed the effect of the different definitions of poverty on poverty incidence.

From any arbitrary levels of poverty line, the basic needs approach picks a certain (a fixed) bundle of goods with certain types and quantities of each good and a certain level of calorie requirement to reflect the absolute poverty line. In doing so, an individual has to consume more than the minimum calorie requirement in order to be non-poor.

In contrast, the UCPL approach taken in this thesis is to pick a constant level of utility. This means the notion of minimum calorie intake used in the basic needs approach is not reflected in the expenditure level, since households can make trade offs between food and non-food. Although the household may be able to buy more than the minimum calories it may buy less owing to expenditure on non-food to a relatively large degree. As mentioned, the choice of the level of utility is arbitrary and this thesis picks two levels of utility.

2.4. Poverty measures (indices)

Having chosen a poverty line, the next step in measuring poverty is to choose a particular measure or index of poverty.

The head count index (HCI) was the first poverty index used in poverty measurement and has been the most popular and widely used measurement, see for example Rowntree (1902), Orshansky (1965; 1969), Watts (1969). Given the poverty line, z, HCI is defined as:

2.2 $$HCI = \frac{1}{N}\sum_{i=1}^{N} I(y_i < z) = \frac{q}{N}$$

where N is the total population, $I(y_i < z)$ is an index function for individual i that takes on a value of 1 if the bracket expression is true and 0 otherwise. If the expenditure of an individual, y_i, is less than the poverty line, z, then $I(.)$ is equal to 1, the individual is counted as poor, and q is the total number of poor in population. This index simply indicates the number of poor in proportion to the total population. It is easy to compute and to interpret and has been popular for these reasons. "The 'nose count' in poverty is one such measure that has little but its simplicity to recommend it" (Watts 1969, p.326).

Despite its popularity, the HCI suffers from weaknesses that have been documented in many places, such as Sen (1976; 1981), Atkinson (1987), and Deaton, (1997), just to mention a few. The weaknesses are twofold (see, Table 2.2). First, the index may not change even if there is an improvement in the income of the poor. Suppose there has been an improvement in expenditure of the poor in Region A but it is still below the poverty line. In this case, a good poverty index should decrease, but in fact the HCI does not change (Case 2, cf 1). Second, any transfer from the very poor to an individual or individuals marginally below the poverty line, i.e., those who will escape from poverty after receiving the transfer, improves the poverty index, i.e., the HCI will go down, while a good measure of poverty should go up (Case 3, cf 1).

Table 2.2: Examples of the weaknesses of the HCI

	Real per capita expenditure in Region A over two years (Rp 000)										HCI
Case 1	50	90	95	105	105	105	105	105	110	110	30%
Case 2, c.f. 1	95	95	95	105	105	105	105	105	110	110	30%
Case 3, c.f. 1	50	80	105	105	105	105	105	105	110	110	20%

Note: Assumption: poverty line is Rp 100.

The second most commonly used measure is the poverty gap index. This index provides information on the amount of expenditure or income by which the poor are below the poverty line, meaning whether they are indeed very poor or almost non-poor. This information is important for governments delivering cash transfer programs for the poor, as applied by the Social Security Administration of the US (Batchelder 1971, p.30). The poverty gap index is defined as:

2.3 $$PGI = \frac{1}{N}\sum_{i=1}^{N}\frac{G_i}{z} \quad \text{, where } G_i = (z - y_i)I(y_i < z)$$

This index is the average of the proportionate poverty gap in the whole population (where the non poor have a zero poverty gap). $I(y_i<z)$ is as defined before. If the expenditure of an individual, y_i, is less than the poverty line, z, the $I(.)$ equals to 1, and the individual is counted as poor. To make the point clearer, see the expenditure distribution in Table 2.3. There are three people in the population counted as poor, namely the first, second, and third person in the table. As the poverty line is determined at Rp 100, the poverty gap (i.e., poverty line minus expenditure) of each of these three people is Rp 50, Rp 10, and Rp 5, or 50 per cent, 10 per cent and 5 per cent of the poverty line, respectively. However, as the total population comprises 10 people, not just

these 3 poor people, so the average of the percentage of the poverty gap (PGI) in the whole population is 6.5 per cent of the poverty line.

Table 2.3: Examples of the poverty gaps measurement

	Real per capita expenditure in Region A over two years (Rp 000)										PGI
Region A	50	90	95	105	105	105	105	105	110	110	
G_i (Rp)	50	10	5	0	0	0	0	0	0	0	
(G_i/z) (%)	50%	10%	5%	0	0	0	0	0	0	0	6.5%

Note:

- Assumption: poverty line is Rp 100
- G_i are poverty gap as defined in equation 2.3 z is poverty line.

The PGI is a better measure of poverty than the HCI, since it is able to indicate 'how poor are the poor?' In other words, it captures the depth of poverty. The poverty gap has a meaningful and appealing interpretation especially in poverty alleviation programs. It can be regarded as the 'per capita theoretical minimum cost' of eliminating poverty (Ravallion 1994; Deaton 1997, p.146). A poverty gap of 6.5 per cent can be interpreted as the cost required to eliminate poverty in the population. As the poverty line is Rp 100, the cost per person (in the population) is Rp 6.5, which means Rp 65 for the entire population.

However, the poverty gap index cannot capture the severity of poverty because it is insensitive to income transfers amongst the poor. To see this, consider the expenditure distribution in Table 2.4. Suppose Case 1 as the original Case, where the HCI is 30 per cent and the poverty gap index is 6.5 per cent. The first person in Case 1 has only Rp 50 of expenditure and is therefore regarded as extremely poor. Compared to Case 1, Cases

2 and 3 are better situations, since the poverty is not as extreme as in 1. Suppose there is an income transfer from the government to the poor, i.e., to the first person (Case 2). The HCI remains constant at 30 per cent. The poverty gap is improved. It decreases from 6.5 per cent to 2.5 per cent. Suppose instead, there has been a transfer of Rp 20 from the second individual to the first (Case 3). It should be interpreted as an improvement in expenditure distribution among the poor relative to Case 1 since it leads to an absence of the extreme poor. Nevertheless, there is no change to the poverty gap index relative to Case 1.

Table 2.4: Examples of weaknesses in the poverty gaps

	Real per capita expenditure in Region A over two years (Rp 000)										HCI	PGI
Case 1	50	90	95	105	105	105	105	105	110	110	30%	6.5%
(G/z) (%)	50%	10%	5%	0	0	0	0	0	0	0		
Case 2	90	90	95	105	105	105	105	105	110	110	30%	2.5%
(G/z) (%)	10%	10%	5%	0	0	0	0	0	0	0		
Case 3	70	70	95	105	105	105	105	105	110	110	30%	6.5%
(G/z) (%)	30%	30%	5%	0	0	0	0	0	0	0		

Note:

- Assumption: poverty line is Rp 100
- G_i are poverty gap as defined in equation 2.3 z is poverty line.

The third measure is the severity of poverty. This index is designed to capture the severity of poverty, which is not captured by the poverty gap index. It is defined as:

2.4 $$SPI = \frac{1}{N}\sum_{i=1}^{N}\left(\frac{G_i}{z}\right)^2, \text{ where } G_i = (z - y_i)I(y_i < z)$$

As can be seen from Table 2.5 (Case 2), a transfer of Rp 20 among the poor, i.e., from the second individual to the first, improves the severity index from 2.6 per cent to only 1.8 per cent. This improvement is not captured by either the HCI or the PGI.

Table 2.5: Examples of improvements of the severity of poverty index

	Real per capita expenditure in Region A (Rp 000)										HCI	PGI	Severity of poverty
Case 1	50	90	95	105	105	105	105	105	110	110			
(G_i/z) (%)	50%	10%	5%	0	0	0	0	0	0	0	30%	6.5%	2.6%
$(G_i/z)^2$ (%)	25%	1%	0.25%	0	0	0	0	0	0	0			
Case 2	70	70	95	105	105	105	105	105	110	110			
(G_i/z) (%)	30%	30%	5%	0	0	0	0	0	0	0	30%	6.5%	1.8%
$(G_i/z)^2$ (%)	9%	9%	0.25%	0	0	0	0	0	0	0			

Note:

- Assumption: poverty line is Rp 100
- G_i are poverty gap as defined in equation 2.3 z is poverty line.

Due to the weaknesses mentioned, Sen (1976) proposed an axiomatic approach to derive a better poverty measure. Sen's index can be written as the average of the HCI and poverty gap measures weighted by the Gini coefficient among the poor - GC^P (Deaton 1997, p.147):

2.6 $$S = HCI * GC^P + PGI * (1 - GC^P)$$

However, the main drawback of Sen's index is its lack of intuitive appeal compared with the previous measures. Moreover, it cannot be additively decomposed into the poverty contribution of different groups. The reason is that the Sen's index depends on the Gini coefficient, which is also not decomposable (Foster 1984; Foster et al. 1984;

Chakravarty 1990; Deaton 1997). Additivity requires that aggregate poverty is equal to the population weighted sum of poverty levels in each sub group of the population.

To overcome the non additivity problem of Sen's index, Foster, Greer, and Thorbecke (FGT) (1984) proposed a class of additively decomposable property measures.

The poverty measures proposed by FGT can be written as:

2.7 $$P_\alpha = \frac{1}{N}\sum_{i=1}^{N}\left(\frac{G_i}{z}\right)^\alpha$$

where:

P_α is the poverty measure,

N is the number of population,

G_i is as defined in equation (2.3),

z is the chosen poverty line,

y_i is household nominal expenditure,

The FGT index combines all measures mentioned: HCI, poverty gap index, and severity of poverty. All of these three indices being special cases of the FGT index, i.e., if:

$\alpha = 0$, P_0 is the HCI,

$\alpha = 1$, P_1 is the poverty gap index,

$\alpha = 2$, P_2 is the intensity or severity of poverty.

The FGT class of poverty measures has been widely used in poverty measurement studies. Among the three poverty measures of FGT, the first two measures are more popular than the third. According to Gibson and Olivia (2005), more than 60 per cent of poverty studies published in academic journals have used the FGT class of measurement. In addition, 25 per cent used headcount ratio only.

The popularity of the HCI and poverty gap measures may reflect the ease of interpretation, especially for implementing and monitoring poverty alleviation programs. They are also simple to compute. Another reason is the additivity property of the FGT index, which enables a decomposition into sub groups to be made. The additivity property has proven extremely useful in constructing a poverty profile (Kakwani 1993, p.633; Deaton 1997, p.147).

For these reasons and following past poverty studies in Indonesia, this thesis also uses FGT poverty measures (with α = 0, 1, and 2) to analyse poverty in Indonesia. The choice of these measures is also to some extent arbitrary. To overcome this arbitrariness and the drawback of these measures, this thesis picks two poverty lines so that poverty figures are indicated by two HCIs and two PGIs as well as SPIs.

2.5. Comparing poverty without a poverty line and poverty indices

This section highlights the possibility of comparing poverty across regions and over time without applying either poverty lines or a poverty measure.

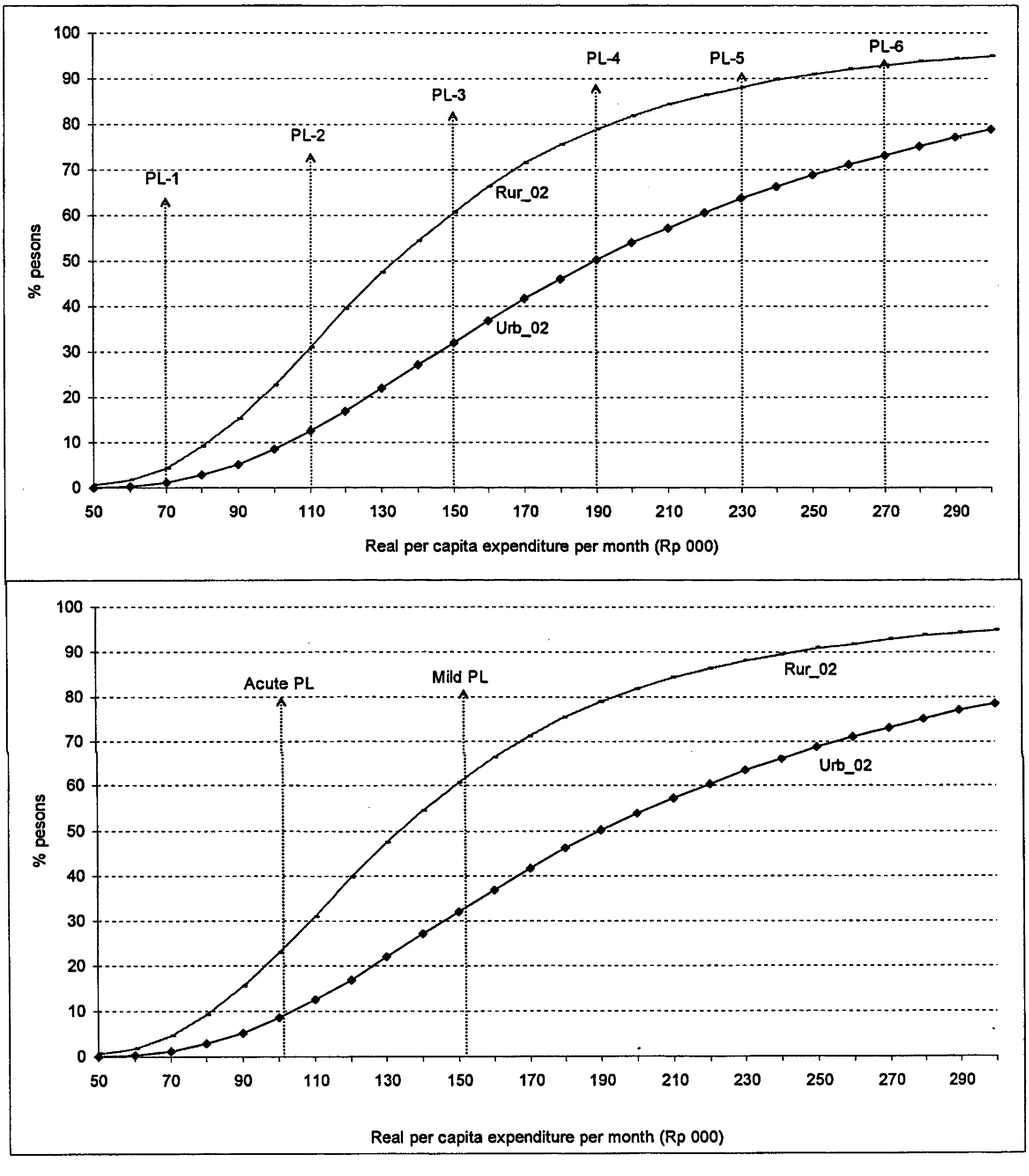
An interesting proposal from Atkinson (1987) could be one solution to the arbitrariness of the poverty line and even the choice of poverty index. He argued that the poverty line is unlikely to be very precisely measured, which means it is inevitably arbitrary. He proposed a stochastic dominance theory, by which poverty measures are robust to the uncertainty of a poverty line and poverty indices. This theory enables poverty measurement to be made without estimating a poverty line and without applying poverty indices.

The basic idea of stochastic dominance is that the welfare level of each person varies with expenditure or income, and therefore welfare is continuously distributed without any 'jumping' between one person and another. There is therefore no sharp jumping in a person's welfare as his expenditure (income) rises from just less than the poverty line to just above. The distribution of welfare across the population is put in a cumulative density function (CDF) framework. Comparing the welfare levels between two regions, for example, can be easily compared through the two CDF for these regions.

First order dominance says that if the CDF of the distribution of expenditure for Region 1 is elsewhere at higher than the CDF of the distribution of expenditure for Region 2, the distribution of Region 2 is 'better' than 1. Wherever one identical poverty line is put into the two CDF, the poverty incidence in Region 1 is higher than 2. This is valid for all indices within the additive decomposable class.

The application of the stochastic dominance theory for Indonesia can be seen in Figure 2.1. This figure shows two cumulative distributions of real PCE per month in 2002 (constant price of rural Indonesia 2002): one is for urban areas and the other is for rural areas. The real PCE in each urban and rural area (in each province) was estimated by deflating nominal PCE with the spatial cost of living index (SCOLI) for 2002 for the related region estimated by the author (to be detailed in Table 4.10 of Chapter 4). The figure is read as follows: the horizontal line indicates the level of real PCE (very high levels of PCE are not shown in the figure) and the vertical line indicates the percentage of persons whose PCE is equal to or below the associated PCE depicted in the horizontal line. For example, with a PCE at a level of Rp 70 thousand, the percentage of persons with expenditure equal to or below this level in urban areas was 1.3 per cent and in rural areas 4.4 per cent. Likewise, take another PCE at a level of Rp 90 thousand. The percentage of persons with expenditure below this level in urban and rural areas was 5.0 per cent and 15.3 per cent, respectively.

Figure 2.1: Cumulative distribution of real per capita expenditure per month for urban and rural areas in 2002 (Rp 000)



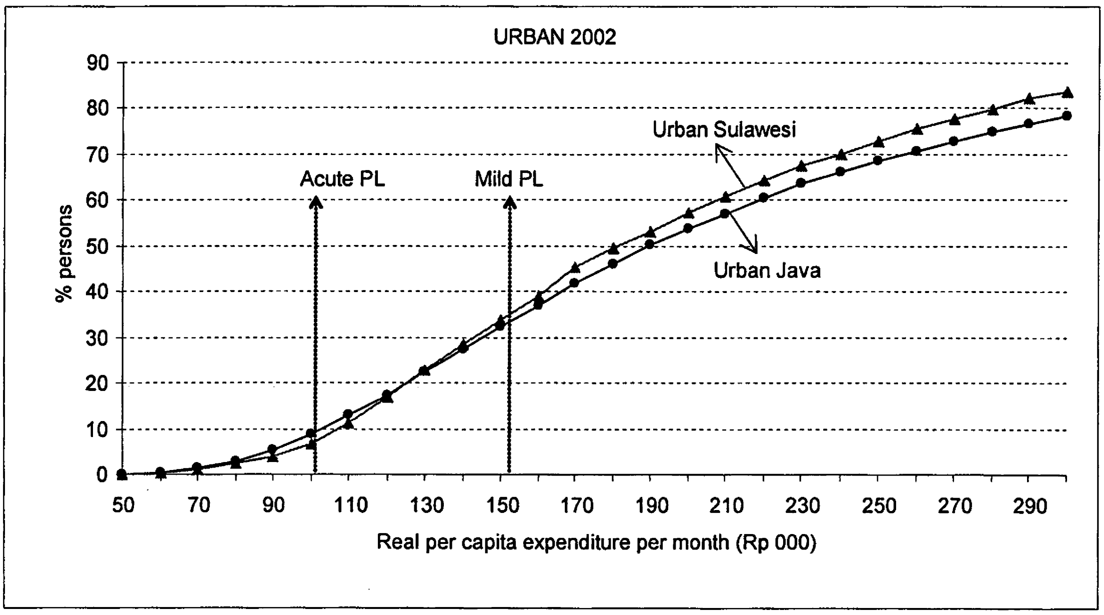
Source: Susenas 2002, Author's calculation.

A lot of poverty lines can be put into Figure 2.1 to indicate the arbitrariness of any one poverty line and each of them gives poverty incidence for urban and rural areas in Indonesia for 2002. Six poverty lines are put into Figure 2.1 (top part) to give some examples. The poverty line could be determined at the level of Rp 70 thousands per capita per month (labelled with PL-1), or at the level of Rp 110 (labelled with PL-2), ..., or Rp 270 (labelled with PL-6). If the poverty line is determined at PL-1, the poverty incidence for urban and rural areas will be 1.3 per cent and 4.4 per cent, respectively. If it is determined at PL-2, the poverty incidence for both areas will be 12.5 per cent and 30.9 per cent, respectively; and if the poverty line is determined at a very high level (PL-6), most of the people will be in poverty with an incidence of 73.2 per cent and 92.8 per cent for urban and rural areas, respectively. All the chosen poverty lines above resulted in an identical conclusion on poverty incidence in 2002. That is, the poverty incidence in rural areas was higher than in urban areas. This is because the CDF for rural areas for all PCE levels are above the CDF for urban areas. This is the main message of dominance theory in poverty measurement.

This thesis takes Atkinson's theory seriously by setting two poverty lines in analysing poverty incidence in Indonesia: namely, an acute poverty line and a mild poverty line. The two poverty lines reflect two chosen levels of utility. As mentioned in the explanation for equation 2.1, a lower level of utility corresponds to an acute poverty line and an upper level of utility corresponds to a mild poverty line. To facilitate comparisons with other researchers, the acute poverty line is set at a level so that poverty incidence at the national level for 2002 based on the UCPL approach was the same as the poverty incidence reported by BPS, whereas the mild poverty line is set at 1.5 times the acute poverty line (see the bottom part of Figure 2.1). Accordingly, the acute poverty line is set at Rp 101.9 thousand per capita per month at rural Indonesian prices for 2002 and the mild poverty line at Rp 152.9 thousand. These two lines are applied for all urban and rural areas in all provinces and for all Susenas years. Using two poverty lines helps to substantially reduce the possibility of misleading HCI results as explained in Table 2.2.

In some cases, two CDFs can possibly intersect at a certain level of PCE. Using two poverty lines can avoid a wrong conclusion in comparing two HCIs in two regions. This may also indicate the type of poverty problem between two regions in the comparisons. This case can be seen in Figure 2.2 showing the CDF for urban Java in comparison with urban Sulawesi for 2002. Acute poverty in urban Java was worse than in Sulawesi, while mild poverty suggests otherwise. This indicates the poverty problem in urban Java is acute poverty, whereas in urban Sulawesi acute poverty is less, but there is a higher incidence of mild poverty. Whether 'poverty' is higher or lower in urban Java than in urban Sulawesi is therefore arbitrary. The answer depends on the choice of the poverty line and on the choice of poverty measure (i.e., the choice of α if one of the FGT measures is chosen). The position taken here is that it is more interesting to report the CDF for the two regions than to make arbitrary choices of poverty line and α and report the resulting numbers. In Chapter 7, the CDFs for the whole of Indonesia are reported for every Susenas year.

Figure 2.2: Examples for cases of two cumulative distributions with an intersection



Source: Susenas 2002, Author's calculation.

2.6. Summary and Conclusions

This thesis uses per capita expenditure as the welfare indicator. The advantages of using expenditure over income to indicate welfare levels are based on both conceptual and practical. On the conceptual basis, expenditure is likely to be a better measure of lifetime welfare than current income. On the practical basis, expenditure is less vulnerable to measurement errors than income. Therefore, this thesis follows the accepted practices in poverty studies in Indonesia by using expenditure data as the welfare indicator. In addition, this thesis uses per capita expenditure, rather than equivalent scales, to take into account household size. This follows the argument that the per capita expenditure is simple and transparent and probably no worse than more elaborate systems that weigh the needs of young and old, males and females.

For monitoring poverty alleviation programs, the poverty line needs to be an absolute concept to avoid misleading poverty figures. Chapter 7 will show that the use of relative poverty lines to monitor the changes in poverty incidence between pre and post the 1997 financial crisis proves misleading. If relative poverty has been used to measure poverty incidence between 1996 and 1999, the poverty incidence would be shown to have declined over the crisis period. However, the CDF approach shows that poverty incidence unambiguously jumped due to the crisis.

The level of any absolute poverty line is fairly arbitrary. The basic needs approach determines a certain type and level of the quantity of goods in the bundle and prices them to get the poverty line. This bundle has to generate the required calories (say, 2100 calories per capita per day). The chosen type and quantity as well as the required calories are arbitrary. In contrast, the UCPL approach determines the level of utility that has to be fixed across regions and over time. The chosen level of utility, which corresponds to a chosen level of poverty line, is also arbitrary. Two level of utility are chosen in this thesis, namely lower and upper levels of utility. The former corresponds to the acute poverty line and the latter to the mild poverty line. Although these poverty lines are arbitrary, the poverty lines are kept constant (in terms of the level of utility) in comparisons across regions and over time.

Stochastic dominance theory shows that poverty comparisons can be made even without a poverty line and poverty index. This thesis makes a start at taking this theory seriously by using 2 poverty lines to measure the incidence of 'acute poverty' and 'mild poverty'. It also reports CDFs for every Susenas year. More poverty lines could be used but providing more information has a cost as well as a benefit: in that it becomes harder to see the wood for the trees. If information could be assimilated costlessly, the optimum would be to report the real expenditure (i.e., price adjusted) of every person surveyed in Susenas. Some aggregation is obviously necessary and aggregation always involves the risk of over simplification. Chapter 7 presents a figure similar to Figure 2.1 for all years. This theory implies the more crucial problem is how to estimate poverty lines for other regions or other times that are consistent with the single poverty line. This involves measuring price changes across regions and over time, which is the subject of Chapters 4 and 6, respectively.

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Chapter 3

A Survey of Methods Used to Estimate Poverty Lines in Indonesia

3.1. Introduction

This chapter sets out the approach used both in this study and other studies to estimate poverty lines in Indonesia. This study tries to approximate a utility consistent poverty line (UCPL). This approach is based on a theory of price index or cost of living index (COLI) and derived from an expenditure function. The poverty line for each region in each Susenas year (1987, 1990, ..., 2002) is estimated through a spatial cost of living index (SCOLI).[1]

The chapter also analyzes the methods of estimating poverty lines that have been used for Indonesia from 1987 to 2002: the official methods and the Ravallion lower poverty line method. The latter method has been widely applied for Indonesia. The analysis focuses on whether these methods generate utility consistent poverty lines. Finally, this chapter describes the detailed steps applied in this thesis to estimate the SCOLI for each region in each Susenas year from the incomplete and somewhat conflicting data that are available.

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[1] As mentioned in Chapter 1, this term refers to price variations across regions.

The organization of the chapter is as follows. The derivation of the UCPL approach is presented in Section 3.2, followed by the development of estimating poverty line methods in Section 3.3. Discussion on the utility consistency of poverty lines that have been used for Indonesia is presented in Section 3.4. Section 3.5 contains step-by-step detail of estimating the SCOLI for each region in each Susenas year. After describing data sources in Section 3.6, the chapter concludes with a summary and conclusions.

3.2. Derivation of a utility-consistent poverty line (UCPL)

This section sets out the UCPL approach through definition of a true cost of living index (COLI).

As defined in equation 2.1 of Chapter 2, a poverty line is one point in an expenditure function evaluated at a certain utility level and at existing market prices. Let the poverty line for base region be:

3.1 $$PL_0 \equiv z_0 = e(p_0, \overline{u})$$

By definition, the ratio of a poverty line in region 1 to a poverty line in some base region is a true COLI, which is defined as the ratio of two values of an expenditure function evaluated at two different price sets: p^1 and p^0 (see for example, Deaton and Muellbauer 1980; Kakwani and Hill 2002):

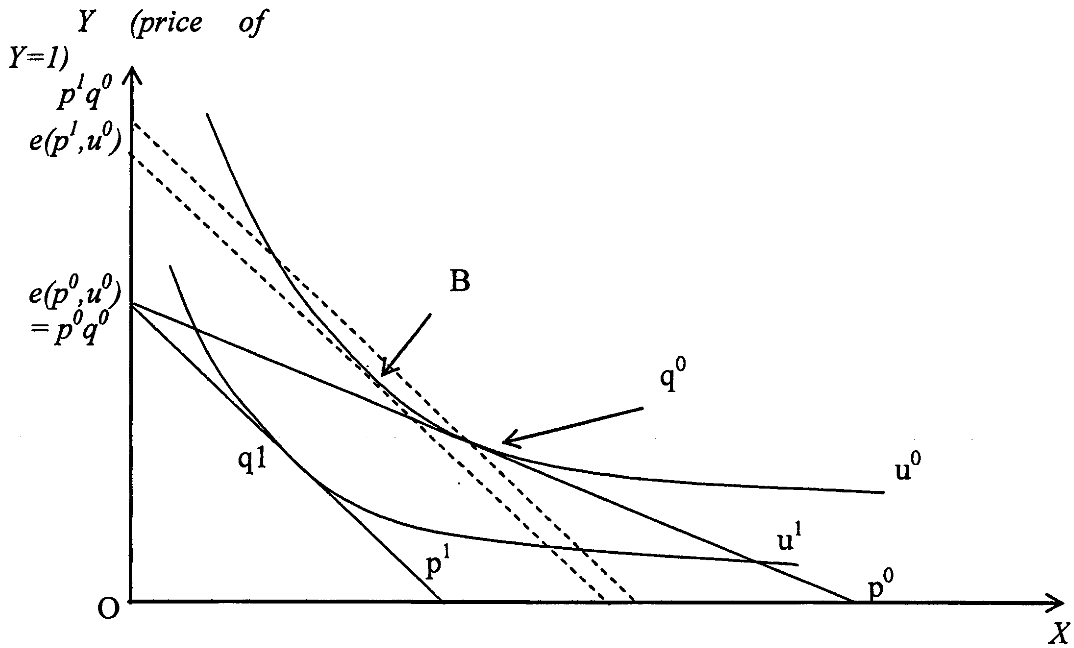
3.2 $$\frac{z^1}{z^0} = \frac{e(p^1, \overline{u})}{e(p^0, \overline{u})} \equiv P(p^1, p^0; \overline{u})$$

where p is a price set, $\bar{u}$ is a fixed utility level, so that $e(.)$ is an expenditure function.

The true COLI can be illustrated in Figure 3.1. Suppose there are two goods: *X*, depicted at the horizontal line, and *Y*, depicted at the vertical line. The price of *Y* is normalized to 1. This normalization gives an advantage, namely the point where the budget line crossing at the vertical line represents the level of income in terms of good *Y*. The relative price in the base region is p^0 and the optimum bundle is q^0 generating utility level u^0. The minimum expenditure level corresponding to this price and utility level is given by $e(p^0,u^0)$. Let the price in region 1 be higher than in the base region, so that the relative price in region 1 is p^1. The minimum expenditure level to achieve the initial level of utility increases to $e(p^1,u^0)$. With this relative price, and after rearranging the goods purchased, consumers in region 1 choose the optimal bundle at point *B*. So, the true COLI is given by the ratio of these two values of expenditure function: $e(p^1,u^0)$ to $e(p^0,u^0)$.

Equation 3.2 is the ideal way to measure the COLI and is done via estimating a system of demand equations. This is ideal since it can capture the substitution effect generated by price changes, i.e., from point q^0 to *B*.

Figure 3.1: Two approaches for estimating COLI



However, this is not a practical way to construct COLI since it requires estimated parameters of the minimum expenditure function (which in turn depend on the functional form of the utility) and a system of demand equations. A different functional form will generate different parameters. The number of parameters that must be estimated in a full demand system rises with the square of (one less than) the number of commodities and quickly becomes impossible to implement at any detailed level of disaggregation (Boskin et al. 1998, p.7). In addition, it requires a great deal of data if generality is to be preserved and even if these are available, the results do not always match the theoretical preconception (Deaton 1997, p.173).

Another way to construct COLI, but with less data, is required (see for example, Aizcorbe and Jackman 1993; Moulton 1996; Boskin et al. 1998). In doing this, the ratio of two poverty lines as in equation 3.2 is best approximated by a Laspeyres price index[2] (Deaton and Muellbauer 1980), which requires a price and the corresponding quantity sets in the base region and the price sets for another region, i.e., p^0, q^0 and p^1, q^0. The index does not require specification of functional forms of the utility and system of demand equations.

3.3 $$\frac{z^1}{z^0} \cong \frac{p^1 q^0}{p^0 q^0} \equiv P(p^1, p^0; q^0)$$

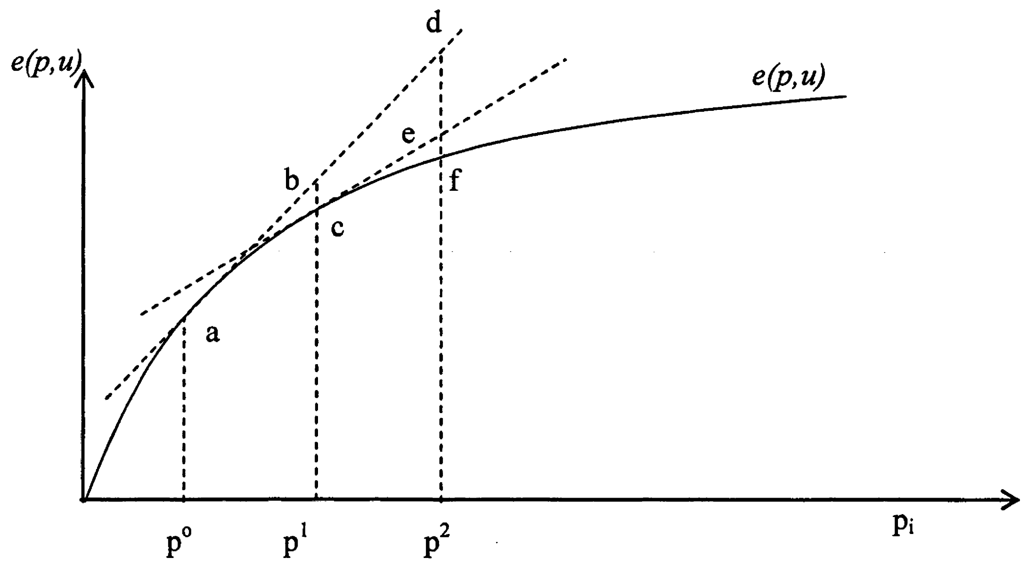
In small changes, the Laspeyres price indices give the same answer as the true COLI. In finite changes, it would be necessary to add up the sequence of changes implied by these indices. This procedure yields what is known as a Divisia index. Rebasing every period gives a good approximation. Figure 3.2 illustrates how re-basing the price index reduces the approximation error. Let p^0 be the price at the initial period, then point *'a'* corresponds to the bundle chosen. When the relative price changes to p^1 in period 1, the linear approximation to the expenditure function is estimated at *'b'* where the true expenditure is at *'c'*. So the distance *'bc'* indicates the approximation error. If the relative price changes to p^2 in period 2 and the basket used to calculate the cost of living index is still in *'a'*, the approximation error will be larger, i.e., indicated by distance *'df'*.

---

[2] An index proposed by Laspeyres in 1871. Price indices were in use long before that, with the first price index proposed by Dutot in 1738 (Diewert 1991). Actually, a Paasche index would provide an equally good approximation, but the index used here is a Laspeyres index and the Paasche index will not be referred to again.

However, by re-basing to point *'c'* the approximation error is reduced to a distance of only *'ef'*.

Figure 3.2: Reducing the approximation errors through re-basing each period



In short, as can be seen from equation 3.3, the main feature of this approach is that once one poverty line has been calculated for the reference region, the poverty lines for the remaining regions (that consistent with the poverty line in the first region in terms of utility) must be estimated using spatial price indices (referred as SCOLI) for the corresponding regions. Another feature is that the types and quantities of commodities in the bundle to calculate the SCOLI are *fixed* across the regions being compared. By this approach, the utility function of all persons in the population is assumed to be identical otherwise any welfare comparisons cannot be made.

3.3. The development of estimating poverty lines methods

This section explores the common methods used to estimate the absolute poverty line. It starts with a discussion of the oldest method, i.e., the basic needs methods and its variation. The next method discussed is the food energy intake method. The last two methods discussed are Ravallion's lower poverty line (LPL) and upper poverty line (UPL).

3.3.1. The basic needs method

The oldest method was the one used by Rowntree back in 1901 when he studied poverty in York (Rowntree 1902). This is called the basic needs approach, or what Sen (1981) referred to as a biological approach. This approach defines poverty as the lack of command over the consumption goods needed to maintain 'physical efficiency', i.e., the ability to undertake manual labour. The main feature of this method is the list of quantities and types of food and non-food regarded as basic needs, applied for every individual. Basically, the steps estimating a poverty line based on basic needs are:

- Estimating the cost of the food basket required to meet the minimum energy requirement. Rowntree assumed a person had to consume 3500 calories including 125 grams of fat. This energy requirement was translated into daily meals (breakfast, dinner, and supper) over a week. For example, breakfast on Sunday consisted of bread (8 oz.), margarine (.5 oz.) and tea (1 pt.) (Rowntree 1902, p.99). Rowntree utilized Atwater's standard nutrition to select the types and quantities of food items in order to provide the required physical efficiency.

These requirements had to be fulfilled for individuals to be out of poverty. Nevertheless, the choices of food types and quantities were somewhat arbitrary as argued here in Section 2.3.2 of Chapter 2.

- An allowance for non-food expenditure was added. Only two main items were included in the non-food expenditure: house rents and household sundries. Household sundries included all necessary expenditure other than for food and house rents, the main items being boots, clothes, and fuel. His choice of non-food was more arbitrary than the choice for basic food needs. He seemed not to include expenditure for health, education, and transportation and so forth in basic non-food needs.

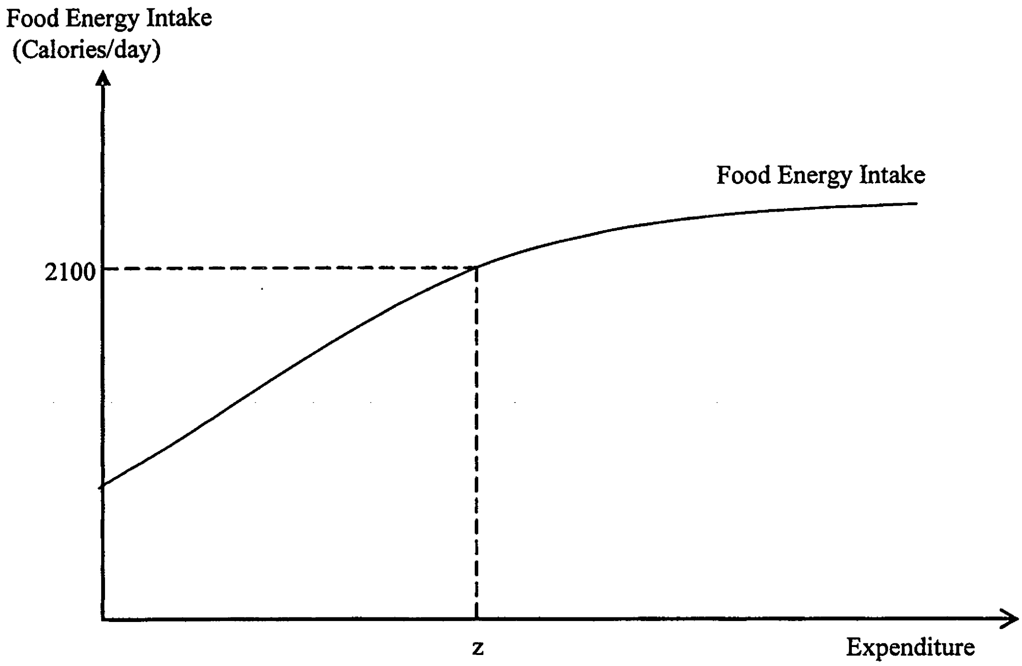
A variation of this basic needs approach was applied in the US by Orshansky (1963; 1965; 1969). She approached the determination of non-food basic needs differently. Instead of determining quantity and type of non-food, she applied a 'food-share' method to reveal the poverty line, i.e., the food poverty line (FPL) divided by the food-share, which was assumed to be 1/3. The food share estimate was based on average food expenditure across the whole population of the United States (Orshansky 1963, p.8). This approach offers a more simple procedure for revealing the poverty line and is easier to implement in practice. In particular, it can be implemented even in the absence of data on non-food prices.

The food-share method could be a solution to the arbitrariness of estimating non-food needs. However, as pointed out by Ravallion and Bidani (1994, p.87), it can result in an inconsistent poverty line. If the food share in each region is estimated as the share of, say, the poorest 20 per cent of people in that region then the resulting poverty line will be biased upwards in relatively rich regions. The reason is that the poorest 20 per cent of people in a rich region will have a smaller food share than the poorest 20 per cent in a poor region. Of course this criticism does not apply to Orshansky's study since she used one single food share – the national average – for all regions. However, her method is biased unless the relative prices of food and non-food are constant (Kakwani 2003, p.11-12).

3.3.2. Food Energy Intake (FEI) Method

The idea of this method is to set the poverty line equal to the average total expenditure (food and non-food) of people who consume the minimum calories requirement – say 2100 calories/day. The poverty line is the total expenditure level at which 2,100 calories/day is achieved. Figure 3.3 illustrates the relationship between the FEI and total expenditure. A higher expenditure level is associated with a higher energy intake level, but at lower increasing rates. This change reflects both Engel's law and also the difference in the source of calories across different level of expenditure. Richer households spend more on food than poor ones, but the share of food in total spending is lower for the rich than the poor. In addition, richer households get the calories intake from more expensive foods.

Figure 3.3: The Calorie intake and total expenditure



This method could be a solution to the 'arbitrariness' of the choice of necessities for both food and non-food. It is a simpler method of estimating a poverty line and requires less data than the full basic needs method. The FEI method does not require a list of food or non-food items in order to get the total expenditure. Another attraction of this method is that it does not require price data, which is often a major problem in developing countries.

The defects of the FEI method were discussed in detail in Bidani and Ravallion (1993), Ravallion and Bidani(1994), and Kakwani (2001). At any given total expenditure level, the food energy intake for households in rural areas tends to be higher than for households in urban areas. The sources of calories intake of households in urban areas are from more expensive items than those in rural areas. For instance, households in urban areas may consume beef as a source of protein in a larger quantity per capita than in rural areas. Conversely, households in urban areas may consume cassava as a source of carbohydrate in a smaller quantity than in rural areas. Therefore, for a given energy intake of 2100 calories/day the expenditure of households in urban areas may substantially higher than households in rural areas. That is, the urban-rural gap of poverty line is much larger than price differentials.

Distribution margins of the commodities from rural to urban areas may explain the source of calories intake pattern between urban and rural areas. It makes the relative prices of cheaper (cassava) and more expensive (meat) sources of calories diverge less in urban than in rural areas. For example, suppose the prices of cassava and meat in rural areas are Rp 1 thousand/kg and Rp 10 thousand/kg, respectively, the price of cassava in rural areas is 10% of meat. Assuming the cost of transportation/kg from rural to urban areas is Rp 0.5 thousand/kg, the prices of cassava and meat in urban areas will be Rp 1.5 thousand/kg and Rp 10.5 thousand/kg, respectively. The price of cassava is now 14% of meat (expensive source of calories), which means the relative price of cassava is more expensive in urban than in rural areas. Therefore, urban people get more of their calories from expensive calorie sources (meat) than rural people.

With some variations this method has been applied in many countries - such as in Indonesia by BPS (1999; 2003c), Mozambique (Tarp et al. 2002), Kenya (Greer and

Thorbecke 1986), Bangladesh (Osmani 1982), the Indian state of Punjab (Paul 1989), and so forth.

3.3.3. Ravallion methods: LPL and UPL

Ravallion (1994) proposed two methods for estimating poverty lines when data on non-food prices in different regions are not available, or at least are imperfect, as in Indonesia. Both methods were a refinement of the basic needs methods of Rowntree and Orshansky as explained by Ravallion and Bidani (1994, p.86). Both methods start from a food poverty line, FPL, which is estimated in the same way as the food component of the utility consistent poverty line used in this thesis. That is, the shares of the various food items are held constant in comparisons across regions and based on the average expenditure patterns of households deemed to be poor.

The fixed food bundle in the Ravallion FPL is an improvement on the FEI method adopted by BPS to estimate regional FPLs. The bias of FEI due to the difference in source of calories is eliminated in the fixed bundle in the Ravallion FPL. However, if there was only one type of food, Ravallion's method would be equivalent to the FEI. BPS seems to have partially adopted the Ravallion method in the BPS-2 method (this will be explained in Section 3.4.1). The Ravallion poverty line also reduces the bias in 'food-share' method of Orshansky. The critical issue in food-share method is which food share should be used to reveal the poverty line. The use of mean share across population as in Orshansky was rather rough. At this point Ravallion makes an improvement to Orshansky's method. Ravallion applies an Engel equation to reveal the food-share in each region so that he is able to adjust the food-share with the impacts of some variables that affect the food share.

The following details Ravallion's two methods and explains how and why they differ. Ravallion's lower poverty line (LPL) is given by the formula:

3.4 $$LPL = (2 - \alpha_L)FPL \ ,$$

and his upper poverty line (UPL) is given by the formula:

3.5 $$UPL = \frac{FPL}{\alpha_U} \ .$$

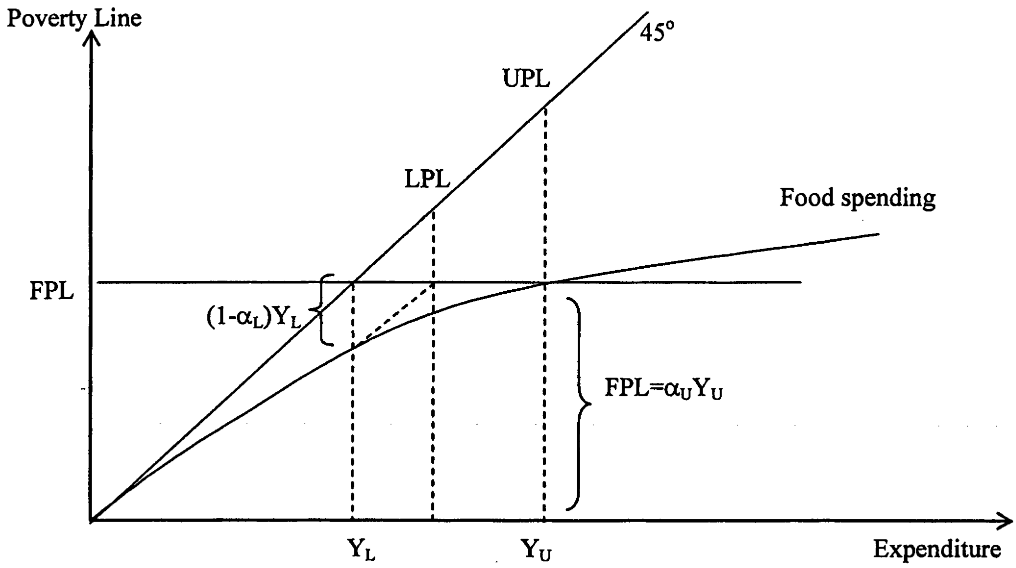
where α_L and α_U are the shares of food in the total spending of two representative individuals, referred to here as Ms L and Mr U. See Figure 3.4 and the following explanation.

Mr U's total expenditure on food is equal to the FPL and the share of food in his total spending is α_U. His total expenditure, Y_U, is therefore:

3.6 $$Y_U = \frac{FPL}{\alpha_U}.$$

This provides the rationale for Ravallion's UPL. That is, the level of expenditure at which the representative person buys enough food to get 2100 calories/day.

Figure 3.4: The lower poverty line and upper poverty line of the Ravallion method



Ms L is substantially poorer than Mr U and only has enough expenditure in total to buy the FPL:

3.7 $$Y_L = FPL$$

Since she consumes some non-food items her expenditure on food is less than FPL and she therefore consumes less than 2100 calories/day. The share of food in her total expenditure is α_L and the share of her total spending that goes on non-food is therefore $(1-\alpha_L)$. Her total expenditure on non food items is $(1-\alpha_L)Y_L$. The Ravallion LPL is got by adding Mr U's expenditure on food, $\alpha_U Y_U$, to Ms L's expenditure on non-food, $(1-\alpha_L)Y_L$:

3.8 $$LPL = \alpha_U Y_U + (1-\alpha_L) Y_L$$

Using equations 3.6 and 3.7, this can be rearranged to give Ravallion's LPL formula:

3.9 $$LPL = FPL + (1-\alpha_L)FPL = (2-\alpha_L)FPL$$

The Ravallion LPL method has been widely used in poverty measurement studies in Indonesia. Apart from Bidani and Ravallion (1993) and Ravallion and Bidani (1994), the LPL method was also applied by Pradhan et al. (2000; 2001), Suryahadi et al. (2000), Alatas (2000), and Ikhsan (1999). The latter (Ikhsan 1999) also used the UPL method.

3.4. Indonesian poverty lines: are they utility consistent?

This section analyses the poverty lines that have been used for Indonesia including the official method (BPS). The analysis focuses on whether estimated poverty lines during the period 1987 to 2002 are utility consistent and focuses on the BPS and Ravallion LPL methods.

3.4.1. BPS methods

Discussion on the BPS methods focuses on poverty lines at the provincial level. In the six Susenas years (i.e., 1987, 1990, 1993, 1996, 1999, and 2002), BPS has applied five different methods for estimating poverty lines, which are referred to here as BPS-1, BPS-2, BPS-3, BPS-4, and BPS-5. The next sub-section looks at one feature that distinguishes all the BPS methods from the UCPL method. That is, in each Susenas year, the quantities of items for estimating both the food poverty line (FPL) and non-food poverty line (NFPL) are variable across urban or rural areas and provinces in the BPS method, whereas these quantities are fixed in the Laspeyres price index used by the UCPL method.

3.4.1.1. BPS food poverty line (FPL)

3.4.1.1a. BPS-1 (1987, 1990): Food Energy Intake (FEI) method

The FPL in each region is the average monthly per capita expenditure (PCE) on all food items of a 'reference population' *in that region*, multiplied by the ratio of 2100 to the average per capita daily calorie intake of the same group. The definition of the reference population has changed over time and is explained below. The scaling ratio ensures the FPL in each region is the cost per month of a quantity of food that provides 2100 calories per person/day.

Notes:

- Household data on PCE were taken from Susenas. BPS estimated per capita consumption of calories by applying estimates of calories per unit for each foodstuff to Susenas data on per capita physical quantities of food consumed in each household.

- In constructing the regional averages mentioned above, BPS did not give an equal weight to each *individual*. Rather, they estimated PCE and per capita calorie consumption for each household and then gave an equal weight to each *household*.

- The *composition* of the food bundle varies from region to region. This is in contrast to the UCPL approach and Ravallion method (Bidani and Ravallion 1993). If the poor consume mostly rice in some regions, the FPL for that region would be approximately equal to the cost per month of the amount of rice needed to provide 2100 calories per day. If in some other region, the poor consume mostly cassava, the FPL for that region would be approximately equal to the cost per month of the amount of cassava needed to provide 2100 calories per day.

- In 1987, only two separate FPLs were estimated: one FPL was estimated for all rural regions in Indonesia and a second for all urban regions. In 1990, 37 separate FPLs were estimated: one for the rural region in each of 17 provinces, one for the urban region in each of the same 17 provinces and one for Jakarta; the remaining two FPLs were one identical FPL for urban areas of the nine remaining provinces and one identical FPL for corresponding rural areas. The nine provinces were Jambi, Bengkulu, Central and East Kalimantan, Central and South East Sulawesi, Maluku, Papua (which was then called Irian Jaya), and East Timor (which was then part of Indonesia).

'***Reference population***' is the selected households in the Susenas data to represent low-expenditure group households, from which the BPS calculates the FPL and NFPL. It is determined by choosing households with nominal PCE within a certain range. The range for urban areas in all provinces is the same and the range for rural areas in all provinces is also the same, but the range for urban areas is higher than for rural areas. In 1990, the reference households were the ones with a monthly PCE between Rp 15 and Rp 20 thousand for urban areas and between Rp 10 and Rp 15 thousand for rural areas.

3.4.1.1b. BPS-2 (1993), BPS-3 (1996), BPS-4 (1996, 1999): FEI method[3]

The FPL in each region is the average monthly PCE on some *'selected'* food items of a *'reference population' in that region*, multiplied by the ratio of 2100 to the average per capita calorie intake of the same reference group of people from the same selected group of food items. Both *the composition* of selected items and *the definition* of the reference population changed over time and across provinces, as explained below. As in the case of BPS-1, the scaling ratio ensures the FPL in each region is the cost per month of a quantity of food that provides 2100 calories per person/ day. The selected items were the ones consumed by the majority of the reference population (BPS 1999, p.21-22). The luxury (expensive) foods, such as imported rice, beef, lamb, *ikan bandeng* (milkfish), and so on were also included in the selected items. In contrast, corn flour, wheat flour, potatoes, dried cassava, and so on, which were consumed by a small number of the reference population, were excluded from the selected items. Since luxury foods were still in the bundle, one of the biases inherent in the FEI method was also still there. That is, it produces a relatively high poverty line in regions where there is significant consumption of foods that are a very expensive source of calories. Also, since the *composition* of the food bundle varies from region to region, the objection of the UCPL approach and Ravallion method (Bidani and Ravallion 1993) to the BPS-1 method was still valid for the BPS-2, BPS-3, and BPS-4 methods.

[3] Note that two FEI methods were applied in 1996.

'***Selected items***': There were 52 food items[4] selected in each Susenas year from 1993 up until 1999. Even though the selected food items in BPS-2, BPS-3, and BPS-4 were always 52 items, this does not mean these items are all the same over time. From one year to another, a few items were dropped and replaced by others. For example, oranges and pineapples in BPS-2 were dropped from BPS-3 and replaced by rambutan and dragon fruit. Moreover, the quantities of an individual food item with the same name in two consecutive Susenas years were not the same as indicated by the quantities of selected food items in the 'standard' food basket. For example, the quantity of rice consumed for rural areas in BPS-2 was 5.11 kg per capita/month (BPS 1999, Table 3.6, p. 37), while in BPS-3 it was 5.25 kg per capita/month (BPS 1999, Table 4.5, p.59). Also, even though the *type* of foods across urban and rural areas within each province is set to be identical, the *quantity* of the item with the same name across urban-rural areas was not the same as in BPS-1. Again, the quantity of selected food items in the 'standard' food basket illustrates this situation (BPS 1999, Table 4.5, p.59). For foods functioning as a source of carbohydrates, quantities tend to be higher in rural areas, but for the ones functioning as a source of protein, quantities tend to be higher in urban areas. For example, in estimating FPL for BPS-3, the quantity of local rice, high quality rice, and cassava (which are a source of carbohydrates) in rural areas were 5.25, 3.8, and 0.9 kg per capita/month. These amounts are all higher than in urban areas, at 5.18, 3.3,

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[4] The 52 items compose what might be called a 'standard' food basket for Indonesia. However, in some regions one or more of the standard items may be replaced by other items if the standard items are not widely consumed in that region.

and 0.4 per capita/month. In contrast, as an example of protein sources, the quantities of milkfish, beef, and commercially bred chicken eggs in urban areas were 0.06, 0.02, 0.34 kg per capita/month, whereas the corresponding amounts in rural areas were only 0.03, 0.01, 0.17 kg per capita/month.

'***Reference population***': For BPS-2 (1993), it was households with a monthly nominal PCE between Rp 30 and Rp 40 thousand for urban areas, and between Rp 20 and Rp 30 thousand for rural areas. For the following Susenas years, it was raised by the inflation rate between the two consecutive Susenas years. Accordingly, the reference population in BPS-3 and BPS-4 (1996) was households with a monthly PCE between Rp 40 and Rp 60 thousand for urban areas, and between Rp 30 and Rp 40 thousand for rural areas; for BPS-4 (1999) it was between Rp 80 and Rp 100 thousand for urban areas, and between Rp 60 and Rp 80 thousand for rural areas (BPS 1999, Table 1.1, p.7).

3.4.1.1c. BPS-5 (2002): FEI method

In the explanation of BPS-5, BPS acknowledged the FPLs in the previous methods were not comparable across regions (BPS 2003c, p.5) and addressed this problem. The following steps were taken by BPS to estimate the FPL in BPS-5 so that the FPL are claimed to be comparable across regions. First, BPS estimated the distribution of the *real* PCE of households in every region using a price deflator for each region. (The price deflator is explained in Appendix 3.1). Second, BPS chose the reference population and determined the *'selected'* food items. Third, the FPL for each region was then estimated in the same way as in previous methods. The FPL in each region in the BPS-5 method is the average monthly *real* PCE (rather than *nominal* PCE as in previous methods) on some ***'selected'*** food items of a 'reference population' *in that region*, multiplied by the ratio of 2100 to the average per capita calorie intake of the same reference group of people from the same selected group of food items. As will be explained in sub-section 3.4.1.2d, the non-food poverty line in BPS-5 is also estimated from *real* PCE. Finally, the estimated poverty lines are compared with real PCE to get the poverty indicators.

According to BPS, the use of real PCE to determine the reference population was to eliminate the effect of difference in the level of expenditure (income) to the selected food items and FPL. In doing so, the difference in the composition of selected food items and therefore in the FPL in each region was not due to difference in the level of expenditure (income), but to difference in preferences and prices (BPS 2003c, p.5).

The objection of the UCPL approach and Ravallion methods to the BPS-1 through to BPS-4 methods was not addressed in the BPS-5 method. The composition of selected food items in the BPS-5 method still varied across regions. Furthermore, the differences in preferences of households across regions adopted by BPS were in contrast with the UCPL approach. As mentioned at the end of Section 3.2, to get consistent poverty lines across regions, the UCPL approach takes an identical preference across all households.

'***Selected items***': As in previous methods, there were 52 food items in the BPS-5 method. However, this does not mean the *type* of selected items in BPS-5 was identical with (say) BPS-3 in 1996. The types of rice included in BPS-5 were only two, namely rice (including local rice, high quality rice, and imported rice) and gluten rice[5] instead of four types of rice as in the BPS-3 (1996) method, i.e., local rice, high quality rice, imported rice, and gluten rice.

'Reference population': no specific range of *real* PCE was given by BPS for the reference population in BPS-5. The information with regard to this was that the reference population was 20% of the population just above the initial estimate of poverty line for 2002, which was the poverty line for 1999 adjusted for inflation from February 1999 to February 2002.

3.4.1.2. BPS non-food poverty line (NFPL)

3.4.1.2a. BPS-1 (1987, 1990): Basic needs method

The NFPL in each region is the cost in that region of a bundle of 'essential' non-food items arrived at by 'professional judgement'. 14 items were deemed to be essential in urban areas and 12 items were deemed essential in rural areas. In 1987, a single NFPL was estimated for all rural areas in Indonesia and a single NFPL for all urban areas in Indonesia. In 1990, 37 separate NFPLs were estimated as in FPL of BPS-1. The items deemed essential are listed in Appendix 3.2. The NFPL in urban areas included the cost of soap, toothpaste, and household utensils, but these items were not deemed 'essential' in rural areas and their cost was therefore not included in the NFPL in rural areas. The

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[5] In the Susenas 2002 questionnaire, expenditure on local rice, high quality rice, and imported rice was recorded as expenditure on one item: 'rice'. In the table of the list of selected items for BPS-5 (BPS 2003c, Appendix 1), there were only two type of rice: 'rice' and 'gluten rice'.

item 'ready to wear clothing' in urban areas was replaced by two items: 'fabrics' and 'tailoring cost' in rural areas. This latter difference may well be a merit of BPS-1 over the seemingly more sophisticated UCPL approach, since the income-in-kind that rural households derive from sewing is not included in the nominal PCE to which the poverty line is compared.

3.4.1.2b. BPS-2 (1993): Orshansky's food-share/Ravallion upper poverty line

The total poverty line in each region is assumed to be the FPL divided by the average share of food in total expenditure in that region. The implicit NFPL for each region can be obtained by subtracting the FPL from the total poverty line. The average of food shares for rural areas in all regions was assumed to be the same. Likewise, the average food share for urban areas in all regions was also assumed to be the same. The food share for urban (rural) areas was estimated from the national mean food share of the reference population in urban (rural). The two references of population were as defined in the discussion of the FPL of BPS-2.

3.4.1.2c. BPS-3 (1996) and BPS-4 (1996, 1999): Basic needs methods [6]

The estimation of the NFPL in each region involved 5 steps:

1. BPS classified non-food products into about 27 sub-groups. Examples of the sub-groups are 'toiletries', 'beauty products', 'men's wear', women's wear', and so

[6] Note that two methods were applied in 1996.

on. The exact number of sub-groups varied between urban and rural areas and between BPS-3 and BPS-4. This is detailed in Appendix 3.3.

2. BPS used Susenas data to calculate the *regional* average of *per capita* expenditure on all items in every non-food group for households in the *reference population* (as defined above in the discussion of the FPL). Per capita expenditure for each household was calculated by dividing total household spending by household size, but each household, rather than each person, got an equal weight in calculating average per capita spending on each broad group of non-food items.

3. BPS used data from a Basic Commodity Baskets Survey (SPKKD: *Survey Paket Komoditi Kebutuhan Dasar*)[7] to identify individual items in each of the sub-group in the Susenas and classify them as 'essential' or 'not essential' for the reference group in each region. For example, 'soap', 'toothpaste', 'shampoo', 'toothbrush', etc. were some of the individual items within the sub-group 'toiletries'; and perfumes, hair oil, facial powder, deodorant, lipstick, etc. were some of the individual items within the sub-group 'beauty products'. In BPS-3, an item was deemed 'not essential' if 30 per cent, or more, of the reference

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[7] SPKKD is a survey to supplement Susenas with a more detailed consumption questionnaire in order to reveal the expenditure on each individual item within sub-group in the Susenas. For non-food expenditure, Susenas only reports the expenditure on sub-group rather than individual items. For example, perfumes, hair oil, facial powder, deodorant, lipstick, etc. are reported as expenditure on sub-group 'beauty product'. The SPKKD is designed to reveal the expenditure on each of these individual items.

population have zero consumption of the item; otherwise, the item was deemed 'essential'. In BPS-4, the cut-off point between 'not essential' and 'essential' items was reduced to only 20 per cent. The upward bias created by the change in cut-off point is discussed in Sub-section 3.4.1.3. BPS then used the SPKKD data to calculate the total share of 'essential' items within each group for each region. The total share of 'essential' items in both BPS-3 and BPS-4 was estimated from the same SPKKD, i.e., SPKKD 1995.

4. The Susenas data on average per capita expenditure in each region on all 'beauty products' from step 1 was multiplied by the estimated share from step 3 of essential spending on 'beauty products' to total spending on 'beauty products'. This gives an estimate for each region of essential per capita spending on 'beauty products' for the reference population. Estimates of 'essential' per capita spending on every other broad group were estimated in the same way.

5. Essential per capita spending in each region on all sub-groups of non-food items was added up to give the NFPL for the region.

3.4.1.2d. BPS-5 (2002): Basic needs method

The estimation of the NFPL in BPS-5 for each region involved 5 steps as explained in BPS-3 and BPS-4. The only difference is on step 2. That is, the *regional* average of *per capita* expenditure on all items in every non-food group for households in the *reference population* (as in discussion FPL) in BPS-5 was in *real* PCE rather than in *nominal* value. The estimation of real PCE of these groups is done by deflating the nominal value with a price deflator as in the FPL of BPS-5. The total share of 'essential' items within each group for each region still used SPKKD 1995 as in BPS-3 and BPS-4.

3.4.1.3. Comparability of the BPS FPL and NFPL

It is clear from the previous discussion that the composition of food items in all BPS FPL methods varied from region to region and from year to year, which is the feature of FEI methods. The difference in FPL across regions and over time is not only due to price variations but also to income variations.

With regard to the NFPL, the increase in the NFPL from one method to another was generally larger than the increase in the FPL. It is shown by the increase in the ratio of the NFPL to the FPL (Table 3.1). However, the change was substantially large from the BPS-3 to BPS-4 method (both for 1996), which was referred to by BPS as 'standard 1998'. The decrease in the cut-off point of 'essential' and 'not essential' non-food items from 30% to 20% raised the ratio substantially. A lot of new non-food items were categorized as 'essential' commodities just because of the decrease in the cut-off point. For example, these 'essential' commodities for urban areas were purchased water, batteries, fees for junior high school, textbooks and stationery for junior high school, and so forth; and for rural areas, health services provided by the community health centre (*Puskesmas*: *Pusat kesehatan masyarakat*) and general practitioners (GP), fees for junior high school, textbooks and stationery for junior high school, and so forth (BPS 1999, p.67). As can be seen from Table 3.1, the ratio increased substantially from 0.29 to 0.38 for urban areas and from 0.18 to 0.32 for rural areas when the method changed from

BPS-3 to BPS-4.

Table 3.1: BPS poverty lines for urban and rural areas from 1987 - 2002

Year (method)	Poverty lines (Rp 000 per capita per month)				U-R differen-ces (%)	HCI (%) [c]		Ratio of NFPL to FPL [d]	
	Urban	Growth (%)	Rural	Growth (%)		pre-crisis methods	post-crisis methods	Urban	Rural
1987 (BPS-1)	17.4	-	10.3	-	69	17.4	-	-	-
1990 (BPS-1)	20.6	18.6	13.3	29.2	55	15.1	-	0.18	0.05
1993 (BPS-2)	27.9	35.4	18.2	37.2	53	13.7	-	0.20	0.17
1996 (BPS-3)	38.3	37.1	27.4	50.3	40	11.3	-	0.29	0.18
(BPS-4)	42.0	-	31.4	-	34	-	17.5	0.38	0.32
1999 (BPS-4)	92.4	141.3 [a)] 119.9 [b)]	74.3	171.2 [a)] 136.8 [b)]	24	-	23.4	0.30	0.24
2002 (BPS-5)	130.5	41.2	96.5	29.9	25	-	18.2	0.40	0.32

Notes:

a) From BPS-3 (1996) to BPS-4 (1999)

b) From BPS-4 (1996) to BPS-4 (1999)

c) As in the explanation for Figure 1.1 of Chapter 1, the HCIs estimated from BPS-1 to BPS-3 were linked with broken lines and from BPS-4 to BPS-5 they were also linked with broken lines. However, no line was drawn between BPS-3 and BPS-4 in 1996, since the HCIs generated by the two methods were apparently not comparable. In line with this, this table presents the HCIs estimated from BPS-1 to BPS-3 (pre-crisis methods) in one column, and the HCIs estimated from BPS-4 to BPS-5 (post-crisis methods) in another column.

d) Recalculated from Tables 3.1 and 3.2 of BPS (2003c, p.20-21).

Source: As for notes.

The huge increase in NFPL from BPS-3 to BPS-4 was the main factor contributing to the large difference in old poverty lines and revised poverty lines for 1996. This is also the factor explaining why the poverty line in BPS-4 (1996) for urban (rural) areas was

Rp 42.0 thousand (Rp 31.4 thousand) per capita/month, 10% (15%) larger than the corresponding poverty line in BPS-3 (also 1996) (Table 3.1).

In sum, the absence of a fixed bundle (food and non-food items) across provinces and over time has been the main factor contributing to the inconsistency of the poverty line. The inconsistency was most pronounced when BPS reduced the cut-off point to categorize 'essential' and 'non-essential' individual non-food items from 30% to only 20% of the reference population. Eventually, this was the factor explaining why the revised poverty incidence in 1996 was 1.5 times the poverty incidence for the same year under the old method (BPS-3). See Figure 1.1 of Chapter 1.

3.4.2. The Ravallion lower poverty line (LPL) method

As mentioned, the Ravallion LPL method has been very popular for poverty studies in Indonesia. Studies applying this method are Bidani and Ravallion (1993), Ravallion and Bidani (1994), Pradhan et al. (2000; 2001), Suryahadi at al. (2000; 2003), and Alatas (2000), and Ikhsan (1999) who also applies the Ravallion UPL. It should be noted that although these studies use the Ravallion LPL, each study determined the reference household differently. Detailed below are the steps applied by Bidani and Ravallion in 1990 - the first poverty study in Indonesia applying the LPL method.

The FPL for each region can be written as:

3.10 $$FPL_j = \sum_{i=1}^{31} p_{i,j} q_i \left(\frac{2{,}100}{k} \right)$$

where i is food item = 1, 2, .., 31; j is a region (e.g,. urban Aceh, rural Aceh, etc.,), j = 1, 2, ..., 50 (all Indonesian regions except East Timor and rural Irian Jaya); FPL_j is the food poverty line in region j; $p_{i,j}$ is the price of food item i at the relevant region; k is the total calorie intake obtained from the 31 selected food items; q_i is the quantity of food item i and is nationally fixed across all regions. It was derived from the lowest 15% of nominal PCE distribution in the Susenas 1990.

The food share used to reveal LPL - α_L - was estimated using an Engel equation applied to all households in the Susenas 1990. Some dummy variables were included, such as regional dummy variables to control factors other than regional cost of living as in the following equation:

3.11 $$\alpha(h) = \beta + \gamma \ln\left(\frac{y(h)}{FPL(h)}\right) + \sum_j \delta_j D_j(h) + x(h)\pi + \varepsilon(h)$$ for household h = 1,..., H in the Susenas 1990.

where j is a region, $\alpha(h)$ is the food share in the expenditure of household, h, with per capita expenditure, $y(h)$; $FPL(h)$ is the food poverty line for region where the household h lives; the square of $(y(h) / FPL(h))$ was also included since it improved the fitness of the regression, $D_j(h)$ is the regional dummies; $x(h)$ is a set of exogenous variables (household characteristics); and $\varepsilon(h)$ is the error terms; and β, γ, δ and π are the parameters to be estimated.

When total expenditure equals the food poverty line, ln $(y(h)/FPL(h))$ = 0, then food share for region j to estimate the LPL - $\hat{\alpha}_L$ - defined as:

$$3.12 \qquad \hat{\alpha}_L(j) = \hat{\beta} + \bar{x}_{(15)}\hat{\pi} + \hat{\delta}_j$$

where $\bar{x}_{(15)}$ is the mean of the demographic variables of the poorest 15% nationally (Bidani and Ravallion 1993, p. 68).

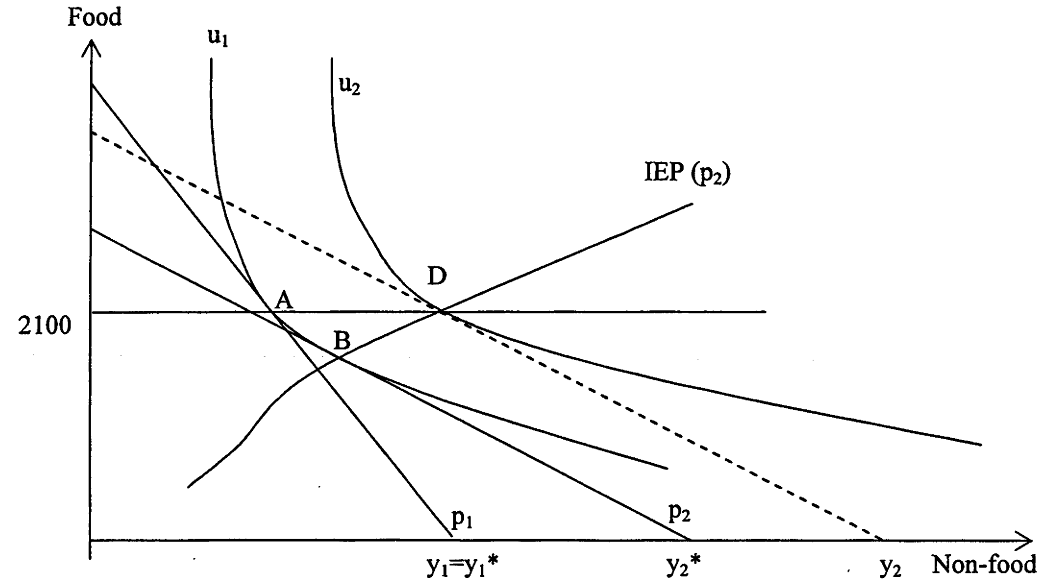
Bidani and Ravallion (1993) came up with very different regional poverty lines and also very different estimates of regional poverty incidence compared to the BPS estimates in 1990. Ranking of provinces by poverty incidence based on the two estimates did not correlate. The Spearman's rank correlation between the two rankings was not significant. The Ravallion method was claimed to be a better approach to measure poverty lines than the BPS, FEI, and Orshansky methods for generating a utility consistent poverty line.

The FPL of the Ravallion method alone is consistent with the UCPL approach. However, the Ravallion LPL method results in a big difference in poverty lines compared with the UCPL approach. It generates an inconsistent poverty line since it fails to capture regional non-food price differences. The regression (as in equation 3.11) cannot separate the effect of non-food price from other variables (Kakwani 2001, p.14; 2003, p.17). Kakwani concludes it is essential to construct a cost of living index across regions comprising both food and non-food items in order to obtain consistent poverty lines.

So, as claimed by Ravallion and Bidani (1994, p.86), the indirect estimation of the non-food poverty line in the Ravallion method is best regarded as an ad-hoc solution to the lack of reliable non-food prices for regional comparisons. Bidani and Ravallion (1993, p.42) noted 'that our objective is not to come up with an alternative estimate of the extent of aggregate poverty incidence in Indonesia, but rather to arrive at a more consistent regional profile of poverty incidence and depth'. In this sense, the Ravallion method is indeed superior to the BPS methods, especially for the food poverty line (FPL), since the FPL is based on a fixed basket for all regions.

Fane (2004) shows that both the UPL and LPL tend to overestimate the poverty line in regions with high food prices relative to regions with lower food prices. Provided that food is a normal good and unless the utility function is Leontief-type, the Ravallion UPL will systematically overcompensate for changes in the price of food. The reason is that when food is more expensive in region 2 than in region 1, a consumer in region 2 will buy less food than a consumer at the same level of utility in region 1. Because they actually buy the same amounts of food if they are both on the Ravallion UPL, and food is a normal good, the consumer in region 2 must be better off than the consumer in region 1. The overcompensation for the food price increase can be easily seen through Figure 3.5, which illustrates the algebraic treatment in Fane (2004).

Figure 3.5: The overcompensation of the Ravallion upper poverty lines for price changes



There are two regions: region 1 and 2 and each has two goods: food and non-food. The price of non-food is normalized at unity in both regions. Choosing units of food so that 1 unit of food provides 1 calorie, the price of food is p_1 in region 1 and p_2 in region 2, $p_2 > p_1$. The Ravallion UPL in the two regions are y_1 and y_2. They are defined as the income, in terms of non-food, at which the person consumes 2100 units of food (i.e., 2100 calories). A person at the Ravallion UPL in region 1 will therefore be at point A with utility u_1, while a person at the Ravallion UPL in region 2, will be at point D with utility u_2. Provided the income expansion path has a positive gradient and provided the indifference curves are curved, and not kinked, it is clear that the person at D must be at a higher level of utility than the person at A. If 'poverty' is defined as being at a lower level of utility than u_1, then the UCPL in region 1 is $y_1^* = y_1$, and the UCPL in region 2 is

y_2^*. In going from region 1 to region 2, the price of food rises, and therefore the UCPL must also rise to compensate the person who is on the border between poverty and non-poverty: $y_2^* > y_1^*$. The Ravallion UPL rises by more, in response to an increase in the price of food than the UCPL: $y_2^* < y_2$. This proves the rise in income of a person who stays at the Ravallion UPL (and moves from point A to point D) overcompensates that person for an increase in the price of food.

As mentioned in Section 3.2, in small changes, the Laspeyres price indices give the same answer as the COLI, thus UCPL. In finite changes, a good approximation to the true price index (COLI) can be obtained by re-basing the Laspeyres index every period. What Figure 3.5 shows is that the Ravallion UPL overcompensates for an increase in the price of food, even in small changes.

To summarize, the poverty lines that have been estimated for Indonesia, both in across region and over time comparisons, are not utility consistent. The absence of a nationally fixed-bundle in the official method is the source of inconsistent poverty lines. This causes variations in poverty lines across regions and over time due to variations in both quantities and prices. The Ravallion method has also generates bias in regions with high food prices relative to regions with low food prices. This may be inevitable regarding this method which is an ad hoc solution in the absence of reliable non-food prices.

3.5. Methods for estimating the SCOLI in each region and year in this thesis

Setting the absolute poverty line for each region and year begins with setting the poverty line for a reference region (i.e., average rural Indonesia in 2002). In doing so, the UCPL approach picks up two levels of utility, i.e., $\underline{u}$: 'acute' poverty and $\bar{u}$: 'mild' poverty, which are somewhat arbitrary. The former corresponds to an acute poverty line and the latter to a mild poverty line. The acute poverty line in the reference region is set at a level such that the poverty incidence in Indonesia in 2002 is equal to the poverty incidence obtained by the official (BPS) estimates for 2002. The mild poverty line is 1.5 times the acute poverty line. The poverty lines for all other regions from 1987 to 2002 are estimated using a spatial cost of living index (SCOLI) for corresponding regions and years. The steps to construct the SCOLI are as follows.

Step 1: The author's fieldwork survey of regional prices in 2004-05. *(Details are in Chapter 4)*

The author conducted a survey of prices in urban and rural markets in 10 provinces over the period November 2004 to January 2005. The surveyed regions are denoted by j and numbered 1 to 20. The set of surveyed regions is denoted by S. About 75 per cent of all people classified as poor by BPS in 2002 lived in the surveyed regions. Jakarta and the urban and rural areas in the remaining 15 provinces were not surveyed. The set of these regions is J and corresponds to values of j from 21 to 51, inclusive. The month in which a price was collected is denoted by t. This information is needed to take account of ongoing price changes while the survey was in progress. The survey covered 31 food items and 18 non-food items. Each item is denoted by i. The prices obtained by the survey are denoted by $p(i, j, t)$.

Step 2: 'Backcasting' the surveyed prices to 2002. *(Details are in Chapter 4)*

The estimated prices of the surveyed items in 2002, which is the most recent year for which detailed expenditure data were available from Susenas, are denoted by $p(i, j, 2002)$ and were estimated from the actual surveyed prices in month t using disaggregated BPS data on inflation by provincial capital cities and items:

3.13 $$p(i, j, 2002) = \frac{p(i, j, t)}{p'(g(i), j, t) / p'(g(i), j, 2002)}.$$

BPS inflation data is available for relatively broad groups of items, rather than for the more narrowly defined items identified in the survey. In the above equation, $g(i)$ denotes the broad group, g, to which individual item i belongs and $p'(g(i), j, t)$ and $p'(g(i), j, 2002)$ denote, respectively, the published BPS data on the price index for this group in month t and calendar year 2002. (Note that the prime denotes official data). The disaggregated BPS inflation data are only available for urban areas. For rural areas, the ratio $p'(g(i), j, t)/p'(g(i), j, 2002)$ was assumed to be equal to the value of this ratio in the urban areas of the same province.

Step 3: Constructing a SCOLI for the surveyed regions in 2002. (Details are in Chapter 4)

Let $\bar{p}(i,2002)$ be the simple unweighted average of $p(i,j,2002)$ over the 20 surveyed regions. The SCOLI for surveyed region *j* in 2002 is given by:

3.14 $$P(j,2002) = \alpha\left(\sum_{i=1}^{49} s(i,2002)\frac{p(i,j,2002)}{\bar{p}(i,2002)}\right), \text{ for } j = 1, 2, \ldots, 20.$$

where:

- α is a constant chosen to ensure that the population weighted average of the index in *rural* areas in the 10 surveyed provinces is equal to 100 in 2002.
- *s(i, 2002)* is the share of item *i* in the total spending of all 'poor' people in 2002. It is derived from Susenas 2002 as follows: first, all Indonesian households were ordered by their per capita nominal expenditure. Second, the poorest 30% of these households was taken. Third, *s(i, 2002)* was estimated as the ratio of spending by all these households on item *i* to their total spending in 2002. Therefore, the shares used in equation 3.14 do not vary from region to region. The 49 items surveyed do not exhaust all items covered by Susenas. To allow for this problem, the shares of non-surveyed items were attributed to 'similar' surveyed items. For example, since rice was the only cereal surveyed, the share of rice was set equal to the share of all cereals, rather than to the share of rice alone. This ensures that shares of the 49 items sum to unity (will be detailed in

the notes of Tables A4.1 of Appendix 4.2 in Chapter 4).

Step 4: Constructing a SCOLI for the non-surveyed regions in 2002. *(Details are in Chapter 4)*

The SCOLI for each non-surveyed region was estimated from (a) the SCOLI for the 'most similar' surveyed region and (b) published BPS data on the ratio of food prices in the non-surveyed and surveyed regions. Let $P(k,2002)$ be the SCOLI for non-surveyed region k and let $j(k)$ be the most similar surveyed region. The full correspondence between surveyed and non-surveyed regions is given in chapter 4.[8] $P(k,2002)$ was estimated as:

$$3.15 \qquad P(k,2002) = P(j(k),2002)\sum_{i=1}^{31}\left(\frac{s(i,2002)}{\sum_{i=1}^{31}s(i,2002)}\right)\frac{p'(i,k,2002)}{p'(i,j(k),2002)}, \text{for } k = 21, \ldots, 51.$$

where $p'(i,k,2002)$ and $p'(i,j(k),2002)$ denote the BPS published data on prices of item i in the urban areas of non-surveyed and surveyed provinces. As explained in step 2, data on price *changes* between 2002 and the time of the survey in 2004/05 are only available for relatively broad groups of items; however, published data do exist on the prices of each item in each province in 2002 (but are not yet available for 2004/05). The 'correction' factor on the right side of the above equation (that is, everything within the

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[8] For example, region 21, urban Bali, was not surveyed. The most similar surveyed region is assumed to be region 1, urban East Java. Therefore $j(21) = 1$.

summation sign) only involves the 31 food items and, as in step 2, if k and $j(k)$ refer to rural areas, the ratio $p'(i,k,2002)/p'(i,j(k),2002)$ was assumed to be equal to the value of this ratio in the urban areas of the corresponding provinces. Some disaggregated price data do exist for non-food items and for rural areas, but, as will be shown in Chapter 4, there appear to be very large differences in the quality of the items among urban areas. In addition, data on rural prices are only available for about half of the items included in the survey.

Step 5: Basing the SCOLI at 100 for rural areas in all provinces in 2002. *(Details are in Chapter 4)*

The SCOLI for all 51 regions in 2002 was re-scaled to make the population weighted average for the rural areas in all 25 provinces equal to 100 in 2002. The resulting index is denoted by $\widetilde{P}(j,2002)$ for $j = 1, \ldots, 51$.

Step 6a: Preferred method of backcasting SCOLI for every region from 2002 to every earlier Susenas year between 1987 and 1999. *(Details are in Chapter 6)*

The preferred SCOLI is referred to as SCOLI-A and denoted by $\widetilde{P}(j,t)$. It is derived as:

3.16a $$\frac{\widetilde{P}(j,t)}{\widetilde{P}(j,t-3)} = \omega(j,t)\frac{P^*(j,t)}{P^*(j,t-3)} + [(1-\omega(j,t)]\frac{P^*(j+1,t)}{P^*(j+1,t-3)},$$

for $j = 1, 3, 5, \ldots, 51$, i.e., all urban areas, 3.16b $$\frac{\widetilde{P}(j,t)}{\widetilde{P}(j,t-3)} = \frac{\widetilde{P}(j-1,t)}{\widetilde{P}(j-1,t-3)},$$ for $j = 2, 4, 6, \ldots, 50$, i.e., for rural areas.

where $\omega(j,t)$ is the share of the urban population to the total population in the province to which j refers. For $j = 1, 3, 5, \ldots, 51$, i.e., all urban areas, $P^*(j,t)$ is an index of urban prices referred to in Chapter 6 as ***P_urb_179***; and for $j = 2, 4, 6, \ldots, 50$, i.e., for rural areas, $P^*(j,t)$ an index of rural prices referred to in Chapter 6 as ***P_rur_68***.

To clarify equations 3.16a and 3.16b, consider Aceh. Urban Aceh is region 1 and rural Aceh is region 2. $\frac{P^*(1,t)}{P^*(1,t-3)}$ gives the change in the urban price index, ***P_urb_179,*** for Aceh. $\frac{P^*(2,t)}{P^*(2,t-3)}$ gives the change in the rural price index, ***P_rur_68,*** also for Aceh.

From equation 3.16a with $j = 1$, $\frac{\widetilde{P}(1,t)}{\widetilde{P}(1,t-3)}$, i.e., the assumed price change for urban Aceh, is therefore a population weighted average of the changes in both ***urban*** and ***rural*** price indices (***P_urb_179*** and ***P_rur_68***) for Aceh. 3.16b makes the inflation rate for rural Aceh, region 2, equal to the inflation rate for urban Aceh, region 1.

It may surprising not to have used ***P_urb_179*** alone for backcasting in urban areas and ***P_rur_68*** alone for backcasting in rural areas. However, as explained in Chapter 6, this leads to seemingly implausible results that are avoided by using equations 3.16a and 3.16b.

Step 6b: Alternative method of backcasting SCOLI for every region from 2002 to every earlier Susenas year between 1987 and 1999. *(Details are in Chapter 6)*

The alternative SCOLI is referred to as SCOLI-B denoted by $\tilde{\tilde{P}}(j,t)$ and derived as:

3.17 $$\frac{\tilde{\tilde{P}}(j,t)}{\tilde{\tilde{P}}(j,t-3)}=\frac{P'(j,t)}{P'(j,t-3)}, \qquad \text{for } j = 1, \ldots, 51$$

where $P'(j,t)$ is the ***urban BPS CPI*** if j is an urban area and is ***rural BPS CPI*** if j is an rural area. In 2002 SCOLI-A and SCOLI-B are identical and given by step 5. For rural areas, the only published CPI estimates are for Java and off-Java. If j is a rural area on Java, $P'(j,t)$ is the on-Java CPI and if j is a rural area off-Java it is the off-Java CPI. There are some reasons why this is not the preferred method. It produces paradoxical estimates in 1999, in the sense that in 11 provinces the implied cost of living in rural areas is *higher* than in urban areas. On the other hand, it produced implausibly large excesses of the urban cost of living over the rural cost of living in many provinces in 1987. On average, the gap was 70 per cent. In addition, the ***urban BPS CPI*** is designed to estimate price changes experienced by the average of all households, whereas the CPI required in applying the UCPL is the one for low-income households. Lastly, the ***rural BPS CPI*** is limited, since it has only two rural CPIs for all of Indonesia, i.e., one CPI for rural Java and another for rural non-Java. These problems are explored in more detail in Chapter 6.

To summarise, the six steps above produce cost of living indices for urban and rural areas in all provinces from 1987 to 2002. The acute poverty line and the mild poverty line are both defined to scalar multiples of these cost of living indices. The scalar multiple for the acute poverty line is chosen to make overall poverty incidence in Indonesia in 2002 equal to the official BPS estimate for that year. The mild poverty line is set to equal 1.5 times the acute poverty line.

3.6. Population and Susenas data

The main data used to calculate poverty are population data and household expenditure data in each region and year. Each of the two sub-sections below describes each data source in order. Some population estimates were made by the author when the published data were not available.

3.6.1. Population data sources

The population data in each region for 1987 are the author's estimates by extrapolation based on the 1980 population and population growth rates in each region between 1980 and 1990 reported by BPS (1991d). The extrapolation in each region uses formula: $N_{j,1987} = N_{j,1980}(1+r_j)^7$, where $N_{j,1980}$ and $N_{j,1987}$ denote number of population in j for 1980 and 1987, respectively; and r_j denotes the average population growth rate in j from 1980 to 1990 reported in BPS (1991d).

The population data in each region for other years: 1990, 1993, 1996, 1999, and 2002 were taken from BPS (1991d; 1994c; 1997c; 2000d; 2003f). The population in urban and rural areas in Aceh, Maluku, and Papua for 2002 were not reported in the relevant BPS publication mentioned. The population in region j (urban or rural areas in these three provinces) was estimated by the author from the information on the head count index in region j (c_j in per cent) and the number of poor in region j (n_j in million people) reported by BPS (2003e). From this information, the total population in a region - N_j - was estimated using: $N_j = \frac{n_j}{c_j}100$.

3.6.2. Susenas data

The Susenas is an annual survey that consists of one core set of questions asked every year and supplemented by one of three different types of modules rotating once every three years. There are regular combinations of the core and the module as follows. In year 1, the surveys are for the core and the expenditure and income module. In year 2, the surveys are for the core and the socio-culture, tourism, welfare and crime modules. In year 3, the surveys are for the core and the health, education, housing and sanitation modules. The three survey combinations are conducted in order, so that every combination is conducted once every three years. The household samples for modules are the sub-samples for the cores. Susenas has been conducted every year or two since 1963-1964 and is an independent pooled cross section, rather than a true longitudinal data. For a detailed development of the Susenas, see Surbakti (1995).

As in other poverty studies in Indonesia, household expenditure data in this thesis is taken from the Susenas expenditure and income module. It records approximately 300 food and non-food items of which food accounts for slightly more than 200 items. The food category is divided into around 14 broad groups of foods (i.e., cereals, tubers, fish, meat, and so on). The non-food category is divided into 6 broad groups (i.e., housing, goods and services, clothing, and so on), each of which was further divided into sub-groups. In the food categories, Susenas records expenditure on every single item in the food categories (e.g., expenditure on local rice, cassava, papaya, and so forth). However, in the non-food categories, Susenas records expenditure on sub-groups rather than on every single item. For example, expenditure on items such as perfumes, hair oil, facial powder, deodorant, lipstick, and so forth were recorded as expenditure on the sub-group 'beauty products'. For this reason, the supplementary survey SPKKD was carried out to reveal the ratio of expenditure on each single item within a sub-group as explained in step 3 of sub-section 3.4.1.2c in this chapter.

In most cases, the Susenas module explores both the value of household expenditure and the quantity of each *food* item consumed. Therefore, it is possible to derive an implicit price for each *food* item by dividing the value of expenditure by the quantity consumed. However, the module does not explore the quantity of non-food consumed by households. As a result, the implicit price for non-food item cannot be estimated.

The expenditure data in the Susenas are at the household level. Per capita expenditure is calculated by dividing total household expenditure by number of family members. A household is categorized as poor if the household per capita expenditure is less than the poverty line and therefore all household members are counted as poor. For example, if the poor household has 5 family members, the poor in this household are 5 persons regardless of the ages of the family members.

The estimation of poverty incidence in urban (rural) areas in each province is as follows. The Susenas expenditure and income module provides information on where households live and on family size. First, the total number of poor persons in all households living in urban (rural) areas is calculated. Second, the total number of persons in all households living in urban (rural) areas is calculated. Third, the poverty incidence in each area is the percentage of total persons in the first step to the total person in the second step.

The total poverty incidence in urban (rural) Indonesia is the population weighted average of poverty incidence in urban (rural) areas across all provinces. The population share in each region is calculated from data sources explained previously.

3.7. Summary and conclusions

This thesis approaches estimating poverty lines through the theory of cost of living index (COLI). This approach is called a utility consistent poverty line (UCPL). The ideal way to estimate the true COLI is through estimating a system demand equation. However, this is not practical as it is vulnerable to the functional form of the utility and the system of demand functions. In addition, it quickly becomes impossible to implement at any detailed level of disaggregation. For practical purposes, the true COLI is best approximated using the Laspeyres price index, which is a first order Taylor-expansion of any expenditure function. Apart from the simple computational advantage, the main advantage of using a price index is that it can accommodate a detailed level of aggregation of the items included in the calculation of the COLI. Accordingly, the main feature of the UCPL is that it has a fixed bundle of goods across regions and prices them by using regional prices. By doing so, the variation of poverty lines across regions (and over time) is only attributed to the variation in prices.

Based on the theory cost of living, this chapter reveals that both the official poverty lines and the Ravallion LPL method do not fulfill the criteria of utility consistency. The official food poverty lines (FPL) are all based on the food energy intake (FEI) method since the *composition* of the food bundle to get the calories requirement of 2100 calories/day varies from region to region and also from year to year. Therefore, the official food poverty lines are biased upwards in relatively rich regions. The official non-food poverty lines (NFPL) have been based on the basic needs approach. However, the criteria to categorize 'essential' and 'not essential' have also been changed over time. The most apparent and substantial change was from the BPS-3 to BPS-4 methods (both for 1996) that raised the ratio of NFPL to FPL dramatically *without* any changes in prices. For urban areas, it increased from 0.29 to 0.38 and for rural areas from 0.18 to 0.32.

The poverty lines generated by the Ravallion LPL method as applied by Bidani and Ravallion and many other researchers are also inconsistent. The LPL (and UPL) are upward biased for regions with a higher food price level relative to regions with cheaper food price levels. Both methods over compensate people on the poverty line for higher prices in higher food price regions. In the absence of reliable non-food price data, some adjustment must be taken and this method is very intuitive. If non-food price data are available, another approach should be taken and calculating a price index (both for food and non-food) in each region is a better approach and is the one used in this thesis. But this approach could only be applied after conducting the special regional price survey described in Chapter 4.

The setting of absolute poverty lines in the UCPL approach begins with setting two poverty lines for a reference region (i.e., average rural Indonesia in 2002): an acute poverty line and a mild poverty line. The former (acute) is set at a level that equates to the poverty incidence based on the UCPL to the official BPS estimate of Indonesian poverty incidence in 2002. The latter (mild) is set at a level 50% higher than the former. The poverty lines for other regions in all years are estimated through a spatial price index called spatial cost of living index (SCOLI). The steps taken to estimate the SCOLI are as follows:

Step 1: Conducting a special survey of regional prices for 49 commodities (31 food items and 18 non-food items) in urban and rural areas of ten provinces in 2004-05. (Details are in Chapter 4).

Step 2: 'Backcasting' the surveyed prices of each item to 2002. (Details are in Chapter 4).

Step 3: Constructing a SCOLI for the surveyed regions in 2002. (Details are in Chapter 4).

Step 4: Constructing a SCOLI for the non-surveyed regions in 2002. (Details are in Chapter 4).

Step 5: Basing the SCOLI at 100 for rural areas in all provinces in 2002. (Details are in Chapter 4).

Step 6a: 'Backcasting' the SCOLI for every region from 2002 to every earlier Susenas year between 1987 and 1999 using the *preferred* method. (Details are in Chapter 6).

Step 6b: 'Backcasting' the SCOLI for every region from 2002 to every earlier Susenas year between 1987 and 1999 using the *alternative* method. (Details are in Chapter 6).

Appendix 3.1: The BPS method for estimating price deflator in BPS-5 (2002)

Steps to calculate price deflators in BPS-5 method (BPS 2003c, p.5-6):

a) Determining a reference population defined as the 20% of population just above the initial estimate of poverty line for 2002, which was the poverty line for 1999 inflated by cumulative inflation between February 1999 and February 2002.

b) Selecting 52 basic food items as a 'standard' food basket. The *type* of each 52 items is fixed nationally, but the ***composition*** varies across urban and rural areas. The price index for each urban and rural area in every province is estimated using formula:

$$P_{i,j} = \sum P_{i,j,k} \alpha_{i,k}$$

where $P_{i,j}$ =average prices across area i (urban or rural areas) in province j,

$P_{i,j,k}$ = average prices for area i (urban or rural areas) in province j, and for commodity k,

$\alpha_{i,k}$ = the proportion of expenditure on commodity k for 2002 for area i, i.e., $V_{i,k}/V_i$ ($V_{i,k}$ = expenditure on commodity k, V_i = total expenditure on the 52 commodity).

c) Calculating the price deflator, which is standardised to Jakarta with the following formula:

$$P_{i,s} = \frac{P_{i,j}}{P_{jak}}$$, where $P_{i,s}$ is the price deflator.

d) Real expenditure for every household was estimated using formula:

$$RE = \frac{E}{P_{i,s}},$$

where RE = real expenditure (calculated for every household)

E = nominal expenditure.

Appendix 3.2: The list of non-food items in BPS-1 method

Table A3.1: The list of non-food basic needs in BPS-1 method (1990)

Urban	Rural
A. Housing, fuel, light, and water	A. Housing, fuel, light, and water
1. Cost of rental housing, 2. Electricity, 3. Kerosene, 4. Water.	1. Cost of rental housing, 2. Electricity, 3. Kerosene,
B. Goods and Services 1. Soap, toothpaste, toothbrush, shampoo, 2. Medication, 3. Doctors and other paramedics, 4. School fee, 5. Transportation cost.	B. Goods and Services 1. Medication, 2. Any kind of traditional healer, 3. School fee, 4. Transportation cost.
C. Clothing 1. Ready to wear clothing, 2. Footwear, 3. Detergent.	C. Clothing 1. Fabrics, 2. Cost for Tailor, 3. Footwear, 4. Detergent.
D. Durable goods 1. Kitchen utensils, 2. Household utensils.	D. Durable goods 1. Kitchen utensils.

Source: Table 2.6 of BPS (1999, p. 17)

Appendix 3.3: The list of non-food items in BPS-3 and BPS-4 methods

Table A3.2: The list of non-food sub-groups in which the total share of 'essential' items were estimated from SPKKD in BPS-3 and BPS-4 methods

	Susenas sub-groups	BPS-3 (1996)		BPS-4(1996, 1999)	
		Urban	Rural	Urban	Rural
A	***Housing and facility***				
1	Housing	✓	✓	✓	✓
2	Electricity	✓	✓	✓	✓
3	Water ("PAM")	No	No	✓	✓
4	Kerosene	✓	✓	✓	✓
5	Firewood and other fuels	✓	✓	✓	✓
6	Others : mosquitoes repellent, matches, batteries, etc.	✓	✓	✓	✓
B	***Good and services***				
7	Toiletries (bathing soap, toothpaste, toothbrush, and shampoo)	✓	✓	✓	✓
8	Beauty products (perfume, pomade, deodorant, powder, etc)	✓	✓	✓	✓
9	Treatment of skin, face, nails, hair (expenses of cutting, curl, etc)	✓	✓	✓	✓
10	Health	✓	✓	✓	✓
11	Expenses of school & courses	✓	✓	✓	✓
12	Postal, Telegram, public phone, and post materials, etc.	✓	✓	✓	✓
13	Costs of transportation (bus, train, airline, ship, etc)	✓	✓	✓	✓
14	Other services (Identity card, photo copy, photo, etc)	No	No	✓	No
C	***Clothes, footwear and head gear***				
15	Ready made man's wear (Blazer, long-sleeved shirt, sarong, etc)	✓	✓	✓	✓
16	Ready made woman's wear (Gown, long fabric, blouse, etc)	✓	✓	✓	✓
17	Ready made children's wear (clothes, pants, sweater, etc)	✓	✓	✓	✓
18	Footwear for man (shoes, sandal, sock, etc)	✓	✓	✓	✓
19	Footwear for woman (slippers, shoes, sandal, etc)	✓	✓	✓	✓
20	Footwear for children	✓	✓	✓	✓
21	Laundry-soap (in bar form, powder, cream, and liquid)	✓	✓	✓	✓
22	Others (towel, belt, shoe polish, tie, tailor-fee, small hanger, etc)	✓	✓	✓	✓
D	***Durable goods***				
23	Furniture's (table, chair, bed, wardrobe, showcase, long-shelf, etc)	✓	✓	✓	✓
24	Kitchen/eaten utensils (plate's rack, stove, cooking pot, pan, etc.)	✓	✓	✓	✓
25	Umbrella, bag, luggage, and its repaired	✓	No	✓	✓
E	***Taxes and insurance***				
26	Taxes and insurance	✓	✓	✓	✓
F	***Festival and ceremony***				
27	Festival and ceremony	✓	✓	✓	✓

Notes:

✓ to indicate that the sub-group was on the list, and 'No' otherwise

Source: Susenas (for detailed items within sub-groups) and BPS (1999, Table 4.7, p.61, Table 5.11, p.83; 2003c, Appendix 2, p.58)

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Chapter 4

A Survey of Prices in 20 Regions: Construction of SCOLI for 2002 and Comparison of this SCOLI with Other Studies

4.1. Introduction

This chapter details steps 1 to 5 from Section 3.5 (Chapter 3) to construct a spatial cost of living index (SCOLI) across urban and rural areas in all Indonesian provinces for 2002. The price data used in constructing the SCOLI are based on a price survey of 31 food and 18 non-food items recently conducted by the author to ensure the comparability of the quality of food and especially non-food items. The survey was carried out in 2004-05 in traditional markets in the urban and rural areas of the ten provinces, where 75 per cent of Indonesian poor lived in 2002 (based on the official estimates). The survey price data are backcast to 2002 using official inflation estimates and combined with official BPS price data to cover non-surveyed provinces.

The organization of this chapter is as follows. Section 4.2 discusses the need for a special survey of regional prices. Section 4.3 deals with the selection of items to be surveyed, the towns and traditional markets in which the survey was conducted. The problems that arose during the collection of price data and the approaches taken to deal with these problems are discussed in section 4.4. Section 4.5 reports the SCOLI for the ten surveyed provinces, followed by comparative analysis between the author's SCOLI and those of other studies. The analysis focuses on three aspects: U-R COL gap[1], arguments critical of the large U-R COL gap implied by BPS poverty lines, and ranking of provinces by SCOLI. Section 4.6 reports the SCOLI for all (non-surveyed and surveyed) provinces in 2002. The chapter concludes with a summary and conclusions.

4.2. The need for special price survey data

This section sets out the argument for the need for a special survey of regional prices to construct the SCOLI and contains three sub-sections exploring the comparability of BPS raw-CPI price data across provinces. The first and second sub-section explore the comparability of raw-CPI prices for food and non-food items. The last sub-section explores in more detail the comparability of rental cost of housing using the case of provinces in Sumatra.

Over a very long period, BPS has estimated an over time Consumer Price Index (CPI). In 2002, the CPI was estimated for each of 43 cities in Indonesia including all provincial capital cities (BPS 2003b). However, a cross-sectional CPI known as a spatial cost of living index, SCOLI, is not calculated by BPS. There are no official explanations as to why SCOLI have not been provided publicly. One of the difficulties might be that the published price data cannot be compared directly possibly because the brand and the quality of the items across cities differ significantly (BPS 1997a). Three decades ago the problem of quality differences was raised by Arndt and Sundrum (1975) when they

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[1] As mentioned, this means the excess of urban SCOLI over rural SCOLI in percentage.

studied the SCOLI across provinces, looking only at urban areas. They noted that some items had enormous regional price variations that were highly likely to be due mainly to quality differences between the products with prices recorded by BPS. This makes implementation of the UCPL approach in Indonesia difficult. Booth (1993) and Bidani and Ravallion (1993) have pointed out that the lack of across provinces price indices has clouded poverty analysis in Indonesia.

There are three possible ways of dealing with the absence of published SCOLI data. The first is to construct a SCOLI using the same data collected by BPS to construct the CPI (raw-CPI price data). The second is to use implicit prices (unit price) derived from the National Socio-economic Survey (Susenas: *Survey Sosial Ekonomi Nasional*) data. The Susenas records the quantity of food items consumed together with total expenditure on these items. Hence, the unit prices of food items can be calculated by dividing total expenditure by the quantity consumed. The third method, requiring a lot more effort, is to collect a new data set by undertaking a special price survey. This is the approach on which this thesis is based. The survey was to collect prices for 49 items (31 food items and 18 non-food items) in traditional markets to make sure the prices are comparable across regions. The remainder of this section details the limitations of using the first two alternatives.

The advantage of using the raw-CPI price data is that the data are readily available from the official source. One weakness in the raw-CPI price data set is the lack of data for rural areas. For example, reported urban 2002 prices (BPS 2003a) cover more than 180 goods and services and all provinces, but reported prices for rural areas in 2002 (BPS

2003d) only cover 87 items and 23 provinces. The selection of items to construct the SCOLI is based on the share of each item in the household expenditure as indicated by Susenas data. Unfortunately, published price data for rural areas do not cover many items that make up a major share of the consumption of the poor (according to the 2002 Susenas).

Another weakness of using the raw-CPI price data is that the comparability of data across provinces is poor. For example, the ratio of maximum to minimum rental cost of housing revealed from the BPS raw-CPI price data was 14 times higher than prices from the author's survey. Housing is indeed a non-tradable good, but it is unlikely the true price difference was that much. It is most likely that the huge difference was explained mainly by the difference in the quality of the house in discussion. (The incomparability problems will be discussed separately in the next three sub-sections).

The second possible way to construct the SCOLI is to use unit price data, which are readily available from Susenas. The main weakness of using the unit price data is that it only covers food items, since Susenas does not explore the quantity of non-food items consumed. In addition, unit prices derived from expenditure survey data (like Susenas) are not direct substitutes for prices collected directly from markets (market prices) as pointed out by Deaton (1988). The reason is the unit price may reflect the quality choice of consumers. Richer households may have better quality of foods and therefore pay higher unit prices. They may occasionally pay a lower per unit price for particular items since they can afford to purchase items in large quantity at a discount price. For example, buying rice in larger amounts, say in one *karung* (40 kg), is cheaper than purchasing only several kilos. Furthermore, according to Deaton, there are three possible biases in using unit prices:

- measurement errors in expenditure,
- measurement errors in quantities consumed, and
- spurious negative correlation between the unit value and the quantity measurement.

4.2.1. Spatial comparisons of food prices

The spatial comparisons of prices in this sub-section (and in the next two sub-sections) focus on the raw-CPI prices for urban areas only, for which the coverage of raw-CPI price are much better than for rural areas as mentioned. In this sub-section, three different data sources for food prices are compared namely the raw-CPI price, the author's survey price, and unit price.

Table 4.1 shows the spatial comparisons for prices of selected food, for which the share in household total expenditure was relatively high: rice (24 per cent), preserved fish: *teri* (2 per cent), papaya (2.3 per cent), sugar (3.1 per cent), and meat balls (5.9 per cent). The comparisons are across the ten provinces in which the author's special price survey was carried out. The price variations in each item across these provinces are shown at the bottom of the table by the ratio of the maximum price to the minimum price.

Table 4.1: Spatial comparisons of three sources of prices data for selected food items in 2002 (Rp 000)

Provinces	Rice (kg)			Preserved fish: *teri* (kg)			Papaya (kg)			Sugar (kg)			Meat balls (Bowl)		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
North Sumatra	3.5	3.0	3.0	30.9	17.7	22.4	3.7	0.9	1.8	3.3	5.4	3.8	3.2	3.2	1.8
South Sumatra	2.9	2.9	2.8	17.7	17.5	19.4	1.8	1.7	1.2	3.3	4.6	4.0	2.0	2.4	1.9
Lampung	2.8	2.7	3.0	22.1	20.6	15.8	1.2	1.2	1.6	3.6	4.2	4.1	4.0	2.1	2.2
West Java	3.2	2.9	3.1	29.6	21.8	16.0	2.0	2.3	1.1	3.7	5.1	4.2	2.5	2.3	1.6
Central Java	3.0	2.8	3.1	16.1	21.8	13.1	0.7	0.9	1.1	3.5	4.5	4.0	2.3	3.2	1.6
East Java	3.0	2.6	3.0	14.2	16.4	14.0	1.5	1.4	1.1	3.5	4.6	4.0	3.3	3.7	1.2
W Nusa Tenggara	2.8	2.6	3.0	35.1	28.1	17.0	1.9	0.7	1.5	3.7	5.2	4.3	2.5	1.7	1.7
South Kalimantan	2.8	2.5	2.5	15.1	26.4	-	1.6	1.4	1.3	3.6	4.7	4.0	-	2.7	1.7
North Sulawesi	3.2	2.9	3.0	20.9	22.9	16.0	4.9	0.9	2.4	3.8	5.6	4.4	-	3.3	2.4
South Sulawesi	2.8	3.1	2.6	18.0	22.2	19.2	3.0	1.2	1.2	3.8	4.7	4.2	-	2.6	1.9
Maximum	3.5	3.1	3.1	35.1	28.1	22.0	4.9	2.3	2.4	3.8	5.6	4.4	4.0	3.7	2.4
Minimum	2.8	2.5	2.5	14.2	16.4	13.0	0.7	0.7	1.1	3.3	4.2	3.8	2.0	1.7	1.2
Ratio Max to Min	***1.3***	***1.2***	***1.2***	***2.5***	***1.7***	***1.7***	***6.7***	***3.4***	***2.2***	***1.2***	***1.3***	***1.2***	***2.0***	***2.1***	***1.9***

Notes: 1=Raw-CPI Price, 2= Author's survey price, and 3= Unit price (derived from Susenas 2002)

Source : BPS (2003a), Author's survey adjusted for inflation, and Susenas (2002)

The BPS raw-CPI prices for food items across urban areas are relatively comparable. The variations in food prices across provinces from this data source seem to be not much different from the others, although there is a tendency of having larger variations. With the exception of papaya, the three sources came up with roughly the same ratios of the maximum price to the minimum price. The ratios for rice, sugar, and meat balls from the raw-CPI are almost identical with the ratios from the author's survey. They are 1.2-1.3 for rice; 1.2-1.3 for sugar; and 1.9-2.1 for meat balls. The tendency for larger variations in the raw-CPI price data can be seen from the prices for papaya and preserved fish: *teri*. For instance, the ratio of the maximum price to the minimum price for papaya estimated from raw-CPI price data was 6.7 (i.e., 2 and 3 times higher than the ratio from the author's survey and the unit price data).

One part of the reason for the relatively small divergence of food prices is that they are tradable goods. Rice, *teri,* papaya, and sugar are probably very intensively traded among the islands. Another reason is that the quality of each food item across provinces is rather similar; for example, rice in sold in Manado (North Sulawesi) was not much different in quality to the rice sold in Makassar (South Sulawesi) or Surabaya (East Java) and so on. As will be seen in spatial comparisons for non-food item, the lack of variations in prices can also be observed from the price of the most tradable and homogenous non-food item, kerosene. Therefore, to a large extent, the similarity in quality of food items across provinces is most likely to be the explanation for the absence of divergence in variations of food prices.

4.2.2. Spatial comparisons of non-food prices

Table 4.2 shows price comparisons for six selected non-food items: rental cost of housing, kerosene, facial powder, bras, T-shirts, and wardrobes. The comparisons are now only between the raw-CPI price and the author's price survey. Unit prices for non-food items cannot be derived from Susenas, which reports total expenditures on these items, but not the quantities bought.

This table clearly reveals the comparability of raw-CPI price for non-food items across regions is not reliable. While the most outstanding differences between the two data sources are the rental cost of housing, apart from kerosene, there are also very large differences for all the other items. The ratio of maximum to minimum price for the cost of housing revealed from the raw-CPI price data was 35, which means it was 14 times higher than the 2.5 ratio from the author's survey. For T-shirts and wardrobes, the corresponding ratios were over 5. For facial powder and bras, they were 4 and 2, respectively. Mistakes during BPS data recording could be one possible explanation for why these large ratios occur in South Kalimantan (see also the rental cost of housing in Sumatra in sub-section 4.2.3). However, tracing the same ratios over time shows random measurement errors are not the main explanation, and high ratios most likely reflect the difference in the quality of these items.

Table 4.2: Spatial comparisons of two sources of prices data for selected non-food items in 2002 (Rp 000)

Provinces	Rental cost of housing (year)		Kerosene (liter)		Facial powder (sachet)		Bra (piece)		T-Shirts (piece)		Wardrobes (piece)	
	1	2	1	2	1	2	1	2	1	2	1	2
North Sumatra	588	952	0.7	1.0	8.7	0.4	17.5	2.3	33.4	21.4	358	277
South Sumatra	220	950	1.0	0.9	4.9	0.4	6.0	5.4	38.5	15.9	867	287
Lampung	477	853	1.0	0.9	0.9	0.5	10.6	3.7	10.4	16.3	294	277
West Java	169	1483	0.7	0.9	8.2	0.4	6.4	4.8	28.6	14.0	1728	234
Central Java	539	641	0.8	0.7	3.7	0.5	6.1	6.8	33.3	19.2	204	201
East Java	431	1312	0.9	0.8	8.5	0.4	21.2	7.8	35.5	15.6	668	194
W Nusa Tenggara	909	814	0.9	1.1	7.9	0.4	10.0	5.0	18.8	18.8	775	301
South Kalimantan	5848	832	0.7	0.9	4.5	0.5	3.7	5.7	18.8	15.5	332	251
North Sulawesi	910	1583	0.9	1.2	7.4	0.9	27.7	5.2	89.9	13.5	475	280
South Sulawesi	334	866	0.8	0.9	4.6	0.4	13.0	5.6	16.1	16.5	463	224
Maximum	5848	1583	1.0	1.2	8.7	0.9	27.7	7.8	89.9	21.4	1728	301
Minimum	169	641	0.7	0.7	0.9	0.4	3.7	2.3	10.4	13.5	204	194
Ratio Max to Min	***34.6***	***2.5***	***1.6***	***1.6***	***9.9***	***2.5***	***7.5***	***3.4***	***8.6***	***1.6***	***8.5***	***1.6***

Notes: 1=Raw-CPI Price, and 2= Author's survey price; Unit price cannot be estimated for most non-food items.

Source : BPS (2003a), Author's survey adjusted for inflation, and Susenas (2002)

Furthermore, the identical ratio for the kerosene price between the two data sources strongly indicates the quality difference across provinces of the raw-CPI price does matter in explaining spatial variations in prices. Kerosene can be regarded as one of the most tradable non-food items across country with probably zero quality difference. When the quality difference is very small, the ratio from the raw-CPI price is identical with the ratio from author's price survey.

4.2.3. Spatial comparisons of rental cost of housing in Sumatra

This sub-section analyses the spatial differences in the rental cost of housing, i.e., a non-food item with a share of almost 10 per cent, the largest among all non-food items. As Arndt and Sundrum (1975) argued, it strongly suggests the large variations in the raw-CPI price across provinces are due mainly to differences in quality.

Table 4.3 shows the rental cost of housing together with the prices for house materials in provinces located in Sumatra. Sumatra is taken as a case study since it gives a good example for the incomparability of the raw-CPI price for the rental cost of housing.

As can be seen from the table, the raw CPI data imply the rental cost of housing in Bengkulu (Capital city of Bengkulu) for 2002 was Rp 1,534 thousand per year, almost seven times higher than the cost in Palembang (Capital city of South Sumatra) – Rp 220 thousand. These two provinces are situated side by side in the southern part of Sumatra Island.

Differences in rental cost can arise from difference in the rental housing market, i.e., demand and supply. However, as shown below that neither effect can explain the very large differences in the price of housing implied by the raw-CPI data. It is concluded that the apparent difference is mainly, or entirely, due to comparing houses of different quality.

Table 4.3: Variation in rental cost of housing and price of house materials in urban areas across provinces in Sumatra based on the BPS raw-CPI price data in 2002 (Rp 000)

City	Rental cost of housing (year)	Brick (piece) a)	Wall paint (5 Kg)	Wood (Bar)	Plywood (sheet)	Sand (m^3)	Cost of labour (person/day)
Banda Aceh	919	250	33.8	49.9	45.6	39.2	29.6
Medan	588	264	43.6	30.2	31.6	36.5	-
Padang	660	160	30.1	20.0	23.7	47.5	29.2
Pakanbaru	1,051	138	28.8	14.5	22.8	96.7	30.0
Jambi	792	285	45.0	-	23.9	28.3	24.6
Palembang	220	253	46.0	24.5	23.9	27.6	34.2
Bengkulu	1,534	134	19.5	14.7	24.6	55.0	30.4
B. Lampung	477	142	27.0	43.7	23.6	68.0	25.0

Notes: a) in Rupiah.

Source: BPS (2003a)

The demand side effects of the cost of housing differences are as follows. The demand for house rental can be approached through the population size of a city. It might be anticipated that the larger the city population, the higher the rental demand, however Palembang is larger, with both a larger population and higher population density than Bengkulu. In 2002, the population density in Palembang was 3,758 per square kilometre compared with only 2,105 in Bengkulu (see, BPS Bengkulu 2002, p. 162; BPS Sumatra Selatan 2002, p.8), so that rental demand in Palembang should probably be higher than in Bengkulu. All other things being equal, this should lead to a higher cost for house rental in Palembang, whereas the cost based on the raw CPI data set indicates the exact opposite.

Supply side effects of the cost differences are as follows. The difference in the rental cost of housing can be traced from material prices, i.e., prices of bricks, wall paint, wood, plywood, sand, and labour. The data in Table 4.3 indicates the differences in these prices are not large. Most prices are also higher in Palembang than in Bengkulu. Apart from plywood, for which the difference is very small, only sand is more expensive in Bengkulu than in Palembang. Bricks, paint, wood, and labour are all apparently cheaper in Bengkulu.

The most likely explanation for the large recorded price difference between the two cities is that the rental properties were not comparable. Those in Bengkulu were probably larger and more central than those in Palembang. If so, this would invalidate the use of the raw-CPI price data for SCOLI comparisons across regions but would not invalidate their use for comparisons over time, for each location. It is important to note that, consistent with this suggestion, BPS uses the raw-CPI price data only for making comparisons over time for each location and does not use them for making comparisons of the spatial cost of living in different places at the same date. For measuring CPI changes over time in Bengkulu and Palembang - in the purpose for which BPS collects these data – it does not matter greatly whether the rental price data collected refer to large or small houses, provided the type of house remains constant over time in each city. It can be concluded that the BPS raw-CPI price data are suitable for the purpose for which BPS uses them, but not for measuring cost of living differences across provinces or between rural and urban areas.

The same situation can be observed with rental cost differences in other provinces. For example, the rental cost in Kupang (capital city of East Nusa Tenggara province) is more than seven times the same rental cost in Mataram (capital city of the neighbouring province, West Nusa Tenggara).

4.3. The author's price survey

Section 4.2 showed that neither the BPS raw-CPI price data nor the unit price data (Susenas) are suitable for measuring SCOLI differences across regions. The former is not suitable for two reasons. First, there is a lack in number of published price data for rural areas. Second, the comparability of the raw-CPI price data set is poor even when the price data are compared among urban areas, with probably an even greater lack of comparability for rural comparisons. The unit price is unsuitable for the reasons given by Deaton for rejecting unit price data. Therefore, it was decided to take the third route of conducting a special price survey for constructing the SCOLI. Later in this chapter raw-CPI price data and the unit price are also used to construct food price indices for comparison purposes.

Together with Section 4.4, this section provides the details of step 1 of Section 3.5 of Chapter 3. That is, Sections 4.3 and 4.4 describe the price survey carried out by the author between November 2004 and January 2005. Section 4.3 deals with the selection of towns and traditional markets; and food and non-food items to be included in the survey. Section 4.4 describes the problems encountered and the strategies taken to deal with them. Sub-section 4.4.4 provides step 2 of Section 3.5 of Chapter 3. That is, it deals with backcasting the author's price survey carried out in 2004/5 to 2002, which was the latest year for which Susenas detailed household expenditure data were available.

The price survey was carried out in 10 of Indonesia's 26 provinces.[2] The ten provinces selected for the data collection are spread out across most large Indonesian islands (see, Figure 4.1). According to the official estimates, these provinces cover 75 per cent of Indonesia's poor (see, Figure 4.2) in 2002. Another criterion for selection was that the time series of rural prices for these provinces are reported by the BPS. Therefore, inflation rates can be estimated for the rural areas in these provinces. This is important for backcasting the SCOLI to earlier Susenas years (steps 6a of Section 3.5 of Chapter 3).

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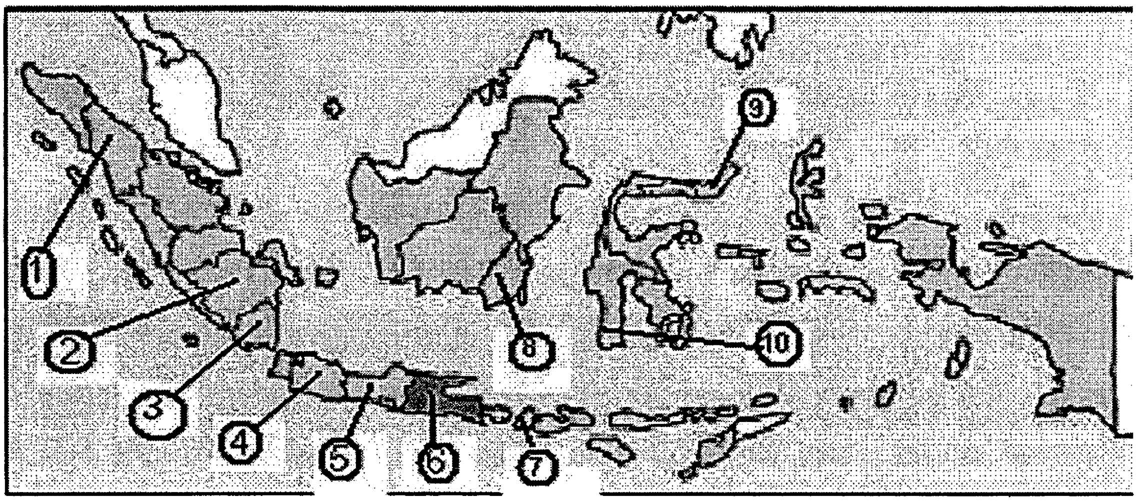
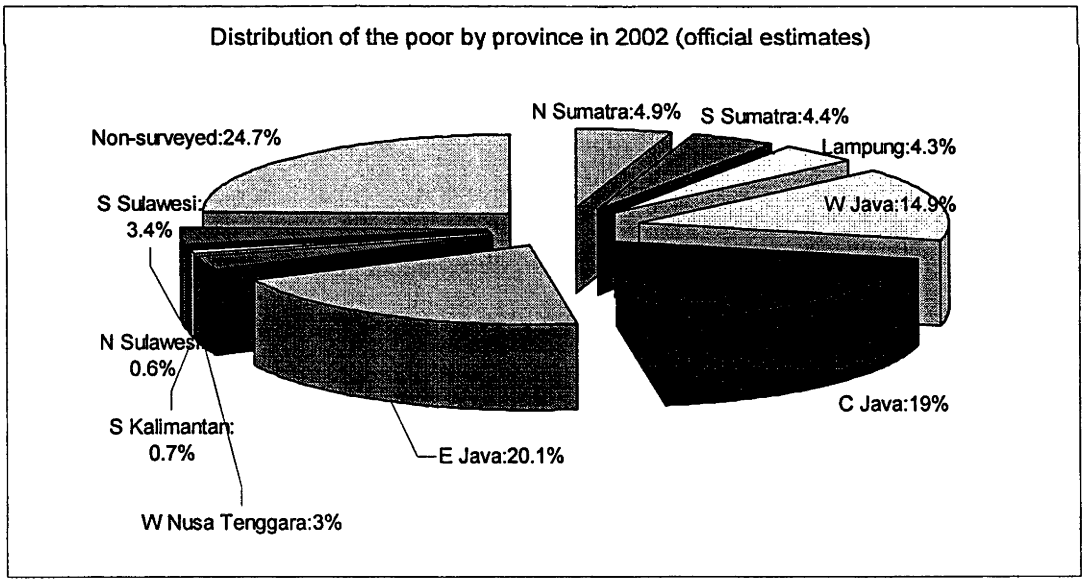
[2] Once East Timor province became an independent country, there were 26 provinces in Indonesia in 1999. All these 26 provinces will be covered in the analysis. The newly formed provinces after 1999 are treated as part of the former provinces. For example, West Java was broken up into (new) West Java and Banten province. All estimates related to West Java are a combination of (new) West Java and Banten.

Figure 4.1: Location of the ten provinces in a map of Indonesia



Notes: 1. North Sumatra, 2.South Sumatra, 3.Lampung, 4.West Java, 5.Central Java, 6.East Java, 7.West Nusa Tenggara, 8.South Kalimantan, 9.North Sulawesi, 10. South Sulawesi

Figure 4.2: The percentage of all Indonesian poor people in the ten provinces surveyed and in the non-surveyed provinces in 2002



Source: BPS (2003e)

4.3.1. Selection of towns and markets for inclusion in the survey

This sub section describes how traditional markets were selected in both urban and rural areas for each of the chosen provinces.

In each province, prices in urban areas were collected from one or more (wherever needed) traditional market(s) located in the provincial capital city, whereas the prices for rural areas were collected from traditional market(s) located in one or more (wherever needed) *Kecamatan* (*rural* sub district/town) centre, within a *kabupaten* (district) next to the provincial capital city. The location of towns ranged from a distance of 30 to 80 km away from these provincial capital cities. (For a description of *kecamatan,* see Appendix 4.1)

The criteria for selected market places was based on two factors. First, it had to be a traditional market, in which retail kiosks were located. Second, it had to be located in an urban area if it represented an urban market and in a rural area if it represented a rural market.

Basically, a traditional market mostly refers to markets outside supermarkets, plazas or similar structures. The prominent characteristic for supermarkets or plazas in Indonesia is that they are usually equipped with air conditioning. The survey collected prices from traditional markets because these are where the poor buy most of their goods. A traditional market sells a variety of basic foods and non-foods. Sales are conducted either by sidewalk sellers or in kiosks inside a building. Sometimes, a traditional market is open air, sometimes there is a roof and pillars without any walls. It may have a cement floor or just a dirt floor which can sometimes be muddy (see, two figures in the second row of Figure 4.3).

Figure 4.3: Typical Indonesian traditional markets

Urban Market: "Pasar Astana Anyar" in Bandung, West Java

Urban Market: a clothing kiosk in "Pasar Bersehati" in Manado, North Sulawesi

Rural Market: "Pasar Bitung" in *Town* Bitung, *District* Banyu Asin, South Sumatra

Rural Market: "Pasar Narmada" in *Town* Narmada, *District* Lombok Barat, West Nusa Tenggara

Following a pre-survey in the capital cities in each of the selected provinces, traditional markets were identified. One or more of these markets in each province was visited to ensure it met the criteria of a traditional market. Once the criteria was met the survey began.

The search for traditional markets in rural areas was based on location, i.e., it had to be in a town or surrounding villages, located outside the main city of the district in a distinctly rural setting, e.g., with surrounding *sawah* (rice fields) and other fields. In most cases, there is a traditional market located in a town centre. Accordingly, once a town was chosen, travelling to the site confirmed whether the town met the selected criteria for a rural market.

Because there are no clear-cut boundaries between towns, district city centres or provincial capital cities, it was sometimes difficult to meet the criteria. The appearance can often be of one long and big city, especially when towns are located on main roads (highways) connecting provincial capital cities to other cities in the province. For example, the selected town for rural markets in Central Java was Babadan, i.e., a town within Semarang District. Both the Babadan and Semarang's District centre (government administration) of Ungaran are located south of the provincial capital city of Central Java, Semarang. Because the main road from the capital city, Semarang, to other large cities in the southern part of Central Java passes through Babadan as well as Ungaran, the whole area has the appearance of an extended city. A lot of kiosks, dwellers, and offices dominate the roadside view from Semarang to Babadan. Although at some distance behind these establishments the land is used for agriculture, there is still an impression that these two cities are one big city. For this reason, in order to find a rural market suitable for the study, the data collection for a rural market in Central Java was made further out. Eventually, two village markets *Jimbaran* and *Bandungan,* about

8 km and 15 km away from Babadan, respectively, were chosen.

Difficulties in fulfilling the criteria for rural markets also arose in the outer islands due to the formation of newly created districts, where an existing district area had been further divided into two or more districts. For example, the selected rural market and town for a traditional market in rural South Sumatra was Pangkalan Balai, i.e., one town in Ogan Komerin Ilir (OKI) District. The town was located in a westerly direction from Palembang, i.e., the capital city of South Sumatra. During travel to the site, it was discovered that this town had just become a newly created district centre, called Banyuasin District as a result of the break-up of OKI District. This meant Pangkalan Balai had just become a city. On observing conditions in the market of Pangkalan Balai, it was discovered that the site still met the criteria for a traditional market, except for the rural criterion. Therefore, the author decided to go further from the provincial capital city to another location in order to meet the location criterion and eventually the data was collected in the town of Bitung (roughly 80 km away from Palembang).

4.3.2. Food and non-food items to be included in the survey

This sub section clarifies the selection of food and non-food items to be included in the survey based on Susenas 2002.

As mentioned, the author collected prices for 31 food items and 18 non-food items. They were chosen from the consumption patterns of the lowest 30 per cent of nominal per capita expenditure distribution derived from Susenas 2002. Table 4.4 presents these items along with their shares (weights) for SCOLI construction. All 2002 Susenas items and the representative (chosen) items are shown in Appendix 4.2.

The sub groups represented in Table 4.4 are identical to those in the Susenas 2002 (i.e., 14 sub-groups, such as cereals, tubers, and fish and are indicated by shading cells. Four non-food sub-groups are housing (including electricity and fuel), goods and services, clothing, and other durable goods. Keeping all sub groups in the Susenas data represented in the table, the selection of food and non-food items is based on items with the largest share in each sub group and the largest number of people consuming these items within each sub group. There is one sub group of food items in Susenas not represented in the table, namely alcoholic beverages. In Susenas, this sub group consists of only three items and both the share and number of consumers is relatively small. Accordingly, this group is discarded and its share assigned to tobacco and betel.

Items numbered 1 to 34 in Table 4.4 are the same as in the Susenas questionnaire. However, other items in the table were chosen to represent a group of items in the Susenas questionnaire. For instance, items 35 (bath soap) and 36 (toothpaste) are selected as representative of a sub-group in the non-food categories that the Susenas questionnaire listed as: *'bathing soap, toothpaste, toothbrush, and shampoo'*. Item 37 (facial powder) and 38 (sanitary napkins) represent another sub-group listed as *'beauty products (perfume, pomade, deodorant, powder, nail clippers, lipstick, comb, etc)'*.

Table 4.4: The list of food and non-food items and their shares in household consumption in 2002

	Items	Unit	Share (%)		Items	Unit	Share (%)
	Food			26	Tamarind	Ounce	0.50
	Cereal		24.04		Other food consumed		1.14
1	Local rice	Kg	24.04	27	Instant noodle	Pack	1.14
	Tuber		1.14		Processed food		6.27
2	Cassava	Kg	1.14	28	Fried rice	Plate	0.40
	Fish		6.14	29	Meat balls	Bowl	5.87
3	Tuna	kg	2.50		Tobacco and betel		7.13
4	"*Kembung*"	Kg	1.64	30	Filtered clove cigarette	Bar	3.77
5	Preserved fish: *teri*	Ounce	2.00	31	Non-filtered clove cigarette	Bar	3.36
	Meat		1.27				
6	Commercially-bred Chicken meat	Kg	1.27		**Non-food**		
	Eggs and milk		2.29		Housing and its facilities		14.54
7	Native-chicken eggs	Kg	1.53	32	Estimated rental cost	Month	9.22
8	Commercially-bred chicken eggs	Piece	0.49	33	Electricity	Kw	2.35
9	Sweetened condensed milk	Can	0.27	34	Kerosene	Liter	2.97
	Vegetables		6.85		Good and services		6.94
10	Spinach	Kg	0.67	35	Bath soap	Piece	1.70
11	Snake bean	Kg	0.90	36	Toothpaste	Piece	1.70
12	Cassava leaves	Kg	0.77	37	Facial powder	sachet	0.58
13	Shallots	Ounce	1.50	38	Sanitary napkins	Piece	0.58
14	Garlic	Ounce	0.78	39	Transportation	Person	2.38
15	Red Chilies	Ounce	1.08		Clothes, footwear, head gear		5.60
16	Small Chilies	Ounce	1.15	40	"Sarong" Cloth	Piece	0.62
	Pulses		2.75	41	T-shirts	Piece	0.62
17	*Tofu*	Kg	1.16	42	Nightgown	Piece	0.67
18	*Tempe*	Kg	1.59	43	Bra	Piece	0.67
	Fruits		2.31	44	School uniform (top)	Piece	1.21
19	Papaya	Kg	2.31	45	Powdered detergent	Sachet	1.81
	Oil and Fats		3.53		Durable goods		1.77
20	Cooking oil	Liter	2.18	46	Plastic chair	Set	0.21
21	Coconut	Piece	1.35	47	Wardrobe	Piece	0.21
	Beverage ingredients		4.21	48	Mattress	Piece	0.40
22	Granulated sugar	Ounce	3.09	49	Stove	Piece	0.94
23	Powdered coffee	Ounce	1.12				
	Spices		2.09		**Food share**		**71.15**
24	Salt	Ounce	1.08		**Non-food Share**		**28.85**
25	Pepper	Ounce	0.51		**Total**		**100**

Note: The shaded rows give totals for the non-shaded rows immediately below. The totals in the shaded rows are derived from Susenas. The shares in the non-shaded rows (i.e., for particular surveyed items) show how these totals have been allocated in the present study among the particular surveyed items. A further explanation can be seen in Appendix 4.2 of this chapter.

Source: Shaded total: Susenas and non-shaded amounts: Author's estimates.

4.4. Problems and strategies adopted in collecting prices data

The price data were collected by the author in direct one-on-one interviews using a questionnaire (see Appendix 4.3), which comprised all food and non-food items shown in Table 4.4. In addition to the unit of measurement of these items, the questionnaire also indicates the characteristics of related items used to guide the author in collecting price data.

The problems in data collection were:

- the unit of measurements across provinces was often different;
- no marked prices in traditional markets;
- differences in quality (heterogeneous) of goods and services existing in the markets.

Another problem was the different dates at which prices were collected from the survey, which was carried out over 3 months. Accordingly, the problem is more related to how to compare the price of (say) rice in a region collected in the first month of survey with the price of rice in another region collected in the third month. The problems and the approaches taken to deal with them are detailed as follows.

4.4.1. Different units of measurement

The units of measurement for the same item often differed across regions. For example, rice and cooking oil are measured in kilos in one region, while in others they are sold in litres; fish and cassava are measured in kilos in one region, while in another they are sold as pieces (individually) and so on.[3] Vegetables are always sold in bunches and the size of a bunch seemed to vary across markets. To deal with this problem, conversion from litres to kilos (or vice versa) and other approaches are applied (see, notes on recorded price in Appendix 4.4 for details).

4.4.2. No marked prices attached to items

Another problem is the absence of any marked prices in the traditional markets for almost all items so that potential buyers must ask sellers the prices. In this case the 'offered' price[4] could be the 'normal' price or it could be higher than normal in an attempt to make more profit. In such situations, bargaining is common. Eventually, the potential buyer may be happy with the price and proceed to purchase the item or may refuse and seek another seller.

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[3] Different terms for measurement were also found. However, this only happened in rural markets in East Java when collecting the price of rice in Gresik District. The term used in purchasing/ selling rice is neither litre nor kg. It is *gantang* meaning 5 litres. It is also well known among people that a *gantang* means 4 kg of rice (1 kg of rice equals 1.25 litres of rice). During the interview, sellers had difficulties when asked the price in a kilo or in a litre. It was later found that the popular way to ask the price of rice is in *gantang*. BPS has been using this equivalency, i.e., 1 kg rice is equivalent to 1.25 litres of rice.

[4] 'Offered' price refers to the price when sellers were asked the price of goods. 'Normal' price refers to the average selling price based on which buyers decide to purchase the item. The difference between these two prices could be relatively high for non-food items. The question used for most non-food items was: 'How much do you usually charge for this *[name of item]*?' However, prices of food items including rice, fish, meat, and vegetables were checked to identify the different prices set by sellers in one market place. These differences were found to be relatively small. In the case of rice, there was almost no difference in price between sellers.

The following details how the data were collected from the kiosks:

1. Data was collected by checking where possible the marked prices attached to each item. However, only eggs and rice were sold in this way in some provinces. The marked price of eggs was only found when eggs were sold individually instead of by kilograms (i.e., in South Kalimantan, North and South Sulawesi, and North Sumatra).

2. Some data were collected by acting as a buyer. This method was used to collect the price(s) of facial powder (the author was accompanied by his wife), vegetables (especially spinach, snake beans, and cassava leaves), and fried rice.

3. The prices of other items were collected via interviews with sellers in kiosks. During these interviews, a questionnaire listing the food and non-food items was used. Both tape recordings and written records were used. A tape recorder was used to check the results of the written records. Interviews were undertaken in several kiosks,[5] as one kiosk did not sell all items listed in the questionnaire. The price of all items was collected after doing interviews in around 20 kiosks. Where a seller was very busy and the kiosk was crowded, the data was collected by interviewing someone who had just purchased items.

[5] They are not necessarily permanent (fixed) kiosks inside the market building. In many cases, they are sidewalk sellers located outside the market building.

In addition to visiting kiosks in the markets mentioned, the electricity price was collected from the head office in Jakarta. It was found that the electricity price for households was the same for all provinces across Indonesia. The prices of wardrobes, chairs, and mattress were often collected from stores outside the market place. Finally, the most difficult part of collecting the data was the rental cost of housing for both urban and rural areas. The cost of rental housing was collected from the head of the tenant household after locating a typical house in the relevant region. The problem of collecting the rental cost of housing is detailed in sub-section 4.4.3.2a.

4.4.3. Heterogeneous commodities

The available goods and services in markets are indeed heterogeneous. This sub-section describes the approaches taken to deal with the problems.

4.4.3.1. Food

It would be easy to compare the quality of food items if they were branded. However, only 7 out of 31 items were branded. These included local rice, powdered coffee, salt, instant noodles, sweetened condensed milk, and filtered as well as non-filtered clove cigarettes.

In the case of rice, there were many rice brands available in the markets, and these differed from one province to another. For example, there were *Pungguk* and *Bengawan* in Central Java; and *Siam, Adil, Urusan,* and *Tanggung* in South Kalimantan and so forth. These brands may be produced from one variety of rice, say, the IR variety rice. For the comparison, the price of the IR variety of rice was recorded whenever possible.

Otherwise, the recorded price was based on rice type consumed by most people within the region. If this did not work, the average of the two lowest prices was recorded.

Brand was ignored for salt during the fieldwork so long as the salt type was as described in the questionnaire. The same approach was applied to coffee. The coffee brand *'Kapal Api'* as described in the questionnaire while popular in Java was very difficult to find in Sumatra. The *'Kapal Api'* brand was not found in either South or North Sumatra. This could be because coffee is one of the popular crops in Sumatra. So the price recorded was the lowest price for powdered coffee (without a brand name) sold in the traditional markets.

The prices for other branded food items (sweetened condensed milk, instant noodles, and cigarettes) were of the relevant brand (or, characteristic) as described in the questionnaire. Whenever the relevant brand could not be found in a traditional market, the price of a competing brand in the same location was recorded with an adjustment factor. The adjustment factor was the relative price of the two brands sold in other retail outlets, i.e., super markets. For example, the brand used in the questionnaire for instant noodles was *'Indomie Rasa Kari Ayam'*. In some regions, the existing brand in the traditional market was *'Sarimie'*, therefore the price of *'Sarimie'* was recorded with an adjustment factor. Let the price of *'Sarimie'* in the supermarket be 80 per cent of *'Indomie Rasa Kari Ayam'*, the recorded price for instant noodle in that traditional market is therefore the price of *'Sarimie'* multiplied by 1.25.

Most other food items were agricultural products, sold almost without any further processing or brand name. Fish, meat, vegetables, and fruit were sold in this way. Some others, like tofu, *tempe* (fermented soy bean), and so forth, are manufactured products and sold without brand names as well. These products were treated as more or less having the same quality as long as the physical characteristics were the same.

4.4.3.2. Non-Food

Non-food items are generally more heterogeneous than food items and the greatest divergences in quality are the ones under the category of durable goods. One of these categories is housing. Others heterogeneous durable goods include 'wardrobes', 'stoves', 'plastic chairs', 'mattresses', and 'clothing'.

4.4.3.2a. Housing, wardrobes, stoves, chairs, and mattresses

As mentioned, the most difficult part of collecting price data during the survey was for the rental cost of housing. It was very difficult to find certain typical low-income housing characteristics as listed in Appendix 4.3 in both urban and rural areas. The difficulty was the large variations in house size and standards in the markets. The latter can sometimes be qualitative, in the sense of whether a house is aesthetically pleasing, or located in a slum area, and so forth. Difficulties also arose from whether a dwelling was a single house or one of several units in the one building. The photographs give some indication of typical dwellings of low income Indonesian people (see, Figure 4.4). Dwelling A is a permanent (full brick) single house, dwelling C is a semi permanent (half brick, half timber) single house. Houses in Banjarmasin (South Kalimantan) are unique in the sense that a red brick house is not common for low-income people. As can be seen in the photograph of dwelling B, the walls are made from wood and so is the floor, and sometimes even the roof. This is because much of the land surface in South

Kalimantan is covered by water and houses are built above the wet surface. According to the definition in the questionnaire, this type of dwelling in South Kalimantan is neither a permanent nor a semi permanent house. However, this type of house was treated as a semi permanent house. Another reason for the difficulties was that houses available for rent were rare in rural markets and there were no agents for rental housing markets among low-income groups, from which the information on the characteristics of rented houses could be found.

Figure 4.4: Typical houses of Indonesian low income people

A. Permanent house in *Town* Bungah, *District* Gresik, East Java

B. Typical house in Banjarmasin, Capital city of South Kalimantan.

C. Semi permanent house in *Town* Pancur Batu, in *District* Deli Serdang, North Sumatra

Accordingly, the author had to observe houses – mostly in the surrounding areas of traditional markets – to find the rental cost typical houses in questionnaire. In most regions, the cost was collected from houses actually being rented. However, in a couple of provinces where a typical rented house was difficult to locate, the approach taken was to locate a typical house from the questionnaire and ask the household head (whether male or female): "how much would you be willing to pay in rental if you did not own this home?"

Other durable goods, such as 'wardrobes', 'stoves', 'chairs', and 'mattresses' were also very heterogeneous. It was easy to get exactly the same quality of wardrobes or stoves in terms of materials used and even their model in East and Central Java. However, beyond these provinces keeping the same quality was very difficult.

The approach taken was as follows. The ideal way to control for quality differences is to use hedonic price techniques in a regression equation (for example, see Ravallion and van de Walle 1991; Anglin and Gencay 1996). The independent variable is the price of the relevant item and explanatory variables are the characteristics of the item. For example, in the case of housing, the independent variable would be the rental cost of housing for the hedonic price of housing, and the characteristic of the house, such as size, number of rooms, whether there is car access, or electricity, and so forth would all be explanatory variables. The information would be needed in each region and for a large enough number of observations.

However, as the recorded prices from the survey were very limited, this approach was not possible. Instead, for most heterogeneous items like these durable goods, the recorded prices have been adjusted by an estimated index of quality based on the physical characteristics of the items existing in the markets during fieldwork (as mentioned in Appendix 4.3). The base quality of (say) a house would be one with characteristics as listed in the questionnaire together with the estimated size and condition. The base quality is equal to 100. If a house in a region has better quality (relative to base quality), it is assigned a higher quality index by author's judgment. One quality index was estimated for each of these durable goods (see Appendix 4.5 for the detailed process of adjustments). To construct the SCOLI, the recorded price for each durable goods from the survey was deflated by the relevant quality index.

4.4.3.2b. T-Shirts and other clothing items

Another heterogeneous non-food item was clothing, especially T-shirts. There were so many T-shirt brands available in the markets, or even in one kiosk, that to take one brand and attempt to find the same brand in another kiosk would be very difficult. For other clothing items, such as *sarongs*, nightgowns, and school uniforms, it was less difficult to find the same brand in one market or region although it was still difficult to find the same brand in a few regions.

Therefore, for T-shirts and other clothing, with the exception of '*sarong*', the prices were collected based on the fabrics used to make them. The recorded price for *'sarong'* was of the brand: *'Gajah Duduk'*. To make clothing comparisons more accurate, samples of men's, women's, and children's clothing were taken by the author to each region during the fieldwork, and used as the benchmark.

4.4.3.2c. Transport

The quality of transport service also varied across provinces. The difference comes from the type of public transportation available and the quality of the service offered. Bus transport is generally available in most cities to service city main roads. Another type of public transport for city main roads is the mini bus as in Palembang, South Sumatra. The mini van (*angkot*) type of public transport services small roads. The vehicle make used for an *Angkot* is different from one city to another, but the *Suzuki Carry* type mini van is mostly used. The quality of service between bus and mini van is a little different. All mini van passengers are seated during the ride, whereas bus passengers are able to stand in the aisle between seats. In all cities, except in Palembang where data were collected from mini buses, data were collected from *angkot.* For the same distance, the *Angkot* fare is uniform within a single city. In some cities, it increases depending on distance, while in other cities it doesn't. However, the cost of transportation was recorded only based on a certain distance as determined in the questionnaire.

Finally, all the adjusted prices along with other recorded prices from the fieldwork are shown in Appendix 4.6.

4.4.4. Different dates for recording prices

This sub-section details step 2 of Section 3.5 (Chapter 3). It details how to backcast the author's price survey carried out in 2004/05 to an average price for 2002, rather than February 2002 in which the 2002 Susenas data was collected. (Also, the backcasting SCOLI in steps 6a and 6b that will be reported in Chapter 6 uses the inflation rates from 'average year' to another 'average year', rather than from 'February' to 'February' in the relevant years in which the relevant Susenas data were collected). This is because the published rural price data for earlier Susenas years were available in 'average year'. This may affect the estimated SCOLI from the backcasting. The ten provinces and the times of data collection are as shown in Appendix 4.7.

Ideally, prices in urban markets should be deflated using urban deflators and prices in rural markets using rural deflators. Because rural deflators are not available, it was assumed that between 2002 and the relevant survey month (e.g., January 2005 for West Java) all prices in both rural and urban areas of each province changed at the same rate. It should be noted, that this assumption does not mean the price levels in both markets are assumed to be at the same level. It does assume that any changes in price level during that period were the same.

As explained in Section 3.5 (Chapter 3), for urban areas ($j = 1, 3, \ldots, 51$), the approach taken was to use official BPS price deflators for broad product groups for the relevant provincial capital city to get an estimate of price changes for each item between 2002 and the survey month using equation 3.13 of Chapter 3. For rural areas ($j = 2, 4, \ldots, 50$), no published BPS price deflators are available, so the urban deflator were used:

4.1 $$\frac{p(i,j,2002)}{p(i,j,t)} = \frac{p(i,j-1,2002)}{p(i,j-1,t)} \qquad \text{for } j = 2, 4, \ldots, 50.$$

These deflators were for 22 separate broad groups of products to which individual items belongs. They are reported by the BPS in each provincial capital city. The indices for 2002 and for the relevant survey months are shown in Table A4.11 of Appendix 4.8. West Java, for instance, had to be deflated using reported price changes between

2002 and January 2005, the latter being the month in which prices in West Java were surveyed by the author. Which items were deflated and by what indices are shown in Table A4.12 of the same appendix.[6]

The estimated prices for 2002 are shown in Appendix 4.9. The SCOLI for 2002 is estimated based on prices shown in this appendix. The following section discusses the results.

4.5. SCOLI for the ten surveyed provinces

This section details step 3 of Section 3.5 (Chapter 3) and reports the estimated SCOLI for the ten surveyed provinces in 2002.

Table 4.5 shows the author's SCOLI and the implicit BPS SCOLI for 2002. The author's SCOLI was calculated using equations as detailed in step 3. The ten provinces in the table are those surveyed by the author and are reported in descending order of rural SCOLI 2002. The implicit BPS SCOLI was estimated based on the published BPS poverty line (BPS 2003c) using formula: (Note that the prime denotes the official data):

4.2 $\widetilde{P}'(j,2002) = \phi[z'(j,2002)]$, for $j = 1, 2, \ldots, 20$

where j is a region (urban/rural in one of 10 provinces in the author's survey and $z'(j,2002)$ is the BPS poverty line for that region in 2002, and ϕ is a constant chosen to

[6] The electricity price was adjusted separately, since although it changes over time, at all times price variations across regions are zero.

make the population weighted average of $\widetilde{P}'(j,2002)$ for rural areas in the ten surveyed provinces equal to 100.

The comparisons between the author's SCOLI, the implicit BPS SCOLI, and others' SCOLI are focused on the urban-rural cost of living (U-R COL) gaps in each province, followed by analysis of why the U-R COL gap implied by official SCOLI are very large. The rank of provinces by the SCOLI will also be analysed. Each of three sub-sections below detailed one issue in order.

4.5.1. U-R COL gap in the surveyed regions

The most prominent difference between the author's SCOLI and the implicit BPS SCOLI for 2002 was the U-R COL gaps generated by the two estimates (Table 4.5 and Figure 4.5). On average, the author's U-R COL gap was only 12.8 per cent and the BPS's gap for the ten provinces was 31.5 per cent, around 2.5 times higher than the author's U-R COL gap.[7] The BPS's gap for the whole of Indonesia for 2002 was 35.2 per cent (see last row Table 4.5). As will be explained in sub-section 4.5.2.3, this large difference is mainly due to the bias in the BPS poverty lines toward income.

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[7] The author also estimated a 2004 SCOLI (November - the first month of price data survey) to see any possible changes in SCOLI over time from 2002 to 2004 due to inflation differences across regions. The 2004 SCOLI was based on the estimated prices for November 2004 and on the same weights as 2002 SCOLI. The estimated U-R COL gap for 2004 was 12.7%, which is almost identical to the gap for 2002.

Table 4.5: The author's and the implicit BPS's SCOLI for 2002 (Rural areas 2002=100)

Provinces [a]	Population share 2002 (%)		SCOLI 2002 (Author's estimates)		Implicit BPS SCOLI 2002 Indexed at rural 2002 [d] =100	
	Urban	Rural	Urban	Rural	Urban	Rural
N Sulawesi	0.48	0.89	121.0	113.6	134.1	114.0
N Sumatra	2.43	3.20	111.4	104.8	137.6	93.1
S Sumatra	1.39	2.44	111.7	104.5	136.6	97.1
W Java	11.44	10.09	119.4	103.6	133.0	101.7
W Nusa Tenggara	0.75	1.21	106.4	100.1	122.9	96.2
S Sulawesi	1.17	2.74	109.7	100.1	126.7	92.3
C Java	6.39	8.63	102.9	98.4	128.1	102.6
Lampung	0.73	2.52	107.4	96.8	130.9	96.7
E Java	7.17	9.49	113.0	94.9	130.1	102.2
S Kalimantan	0.54	0.90	111.1	94.4	138.5	89.2
Wtg. Avg. 10 prov.	32.49 [b]	42.11 [b]	112.8	100.0	131.5	100.0
U-R COL gap [c] (%) (ten prov.)			12.8		31.5	
U-R COL gap (%) (all prov.)			-		35.2	

Notes:

a) Provinces are the ten provinces included in the author's price survey. They are ranked by a decreasing order of rural SCOLI 2002.

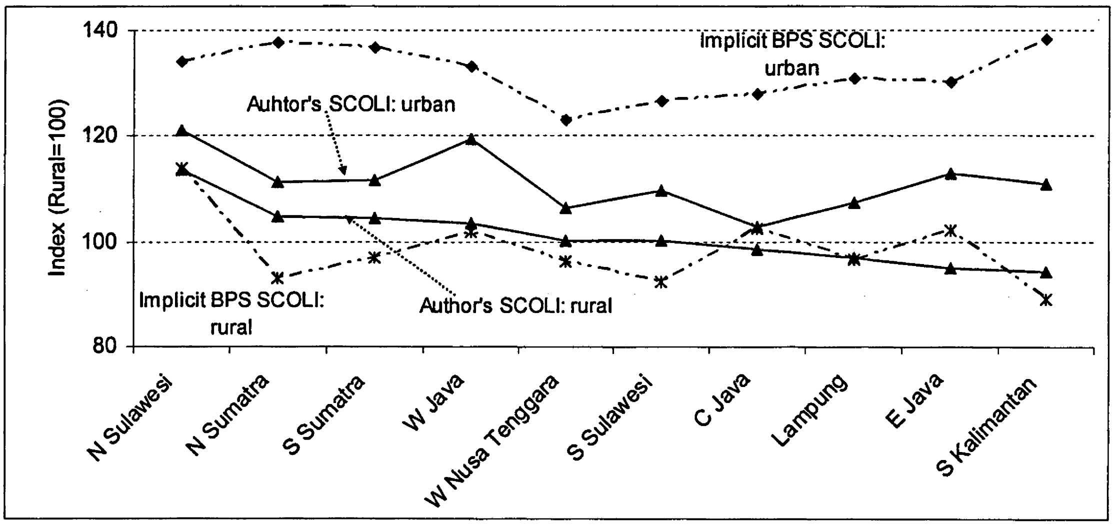
b) Sum of population shares of the ten provinces; 32.49% + 42.11% = 74.6%. The remaining 25.4% of the total population on Indonesia are in provinces not covered by the author's survey.

c) U-R COL gap is defined as the percentage of excess of urban SCOLI over rural SCOLI.

d) The implicit BPS SCOLI is calculated using equation 4.2

Source: Author's estimates, and BPS (2003f; 2003e)

Figure 4.5: The author's and the implicit BPS SCOLI for 2002 (Rural = 100)



Note: As for Table 4.5

Source: Table 4.5

The author's U-R COL gap is consistent with other studies on urban-rural cost of living differentials. According to Asra (1999), the U-R COL gap from 1987 to 1996 was estimated at only 13-16 per cent and according to a much earlier estimate by Ravallion and van de Walle (1991), it was only 10 per cent for 1981. In addition, the author's SCOLI gap for 2002 was also broadly consistent with the gap implied by other poverty lines studies. These studies applied the Ravallion lower poverty line method. As can be seen from Table 4.6, the gap for 1990 implied by the Bidani and Ravallion poverty line (1993) was 15 per cent for the ten provinces and 18 per cent for all provinces; the gap for 1996 and 1999 implied by the Pradhan et al. poverty line (2000; 2001) was 10 and 15 per cent for the ten provinces, and 12 and 17 per cent for all provinces. It is clear the BPS's gap is an extreme outlier and the author's gap is of a similar order of magnitude to those estimated in the other five studies mentioned.

Table 4.6: The Author's SCOLI and other alternative estimates of SCOLI (average rural = 100)

Provinces	Author's SCOLI 2002		Pradhan et al. SCOLI 1999		Pradhan et al. SCOLI 1996		BR SCOLI 1990	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
North Sulawesi	121.0	113.6	108.6	102.0	115.1	97.7	105.7	104.2
North Sumatra	111.4	104.8	103.6	92.4	109.9	95.7	120.6	97.3
South Sumatra	111.7	104.5	106.2	99.3	106.4	94.6	108.1	104.9
West Java	119.4	103.6	117.2	106.8	125.2	107.9	123.0	107.2
West Nusa Tenggara	106.4	100.1	109.0	105.2	111.7	104.1	112.2	91.2
South Sulawesi	109.7	100.1	105.0	92.3	103.3	87.9	124.3	96.2
Central Java	102.9	98.4	105.5	97.4	113.8	101.6	96.5	96.3
Lampung	107.4	96.8	110.3	97.6	105.2	92.2	112.3	103.2
East Java	113.0	94.9	105.5	99.3	108.2	97.4	118.7	96.5
South Kalimantan	111.1	94.4	107.9	102.9	118.5	104.1	112.5	104.5
Wtg. Avg. 10 Prov.	112.8	100.0	109.7	100.0	115.2	100.0	115.0	100.0
U-R COL gap (%) 10 Provinces	12.8		9.7		15.2		15.0	
U-R COL gap (%) all Provinces	-		11.5		16.6		18.0	

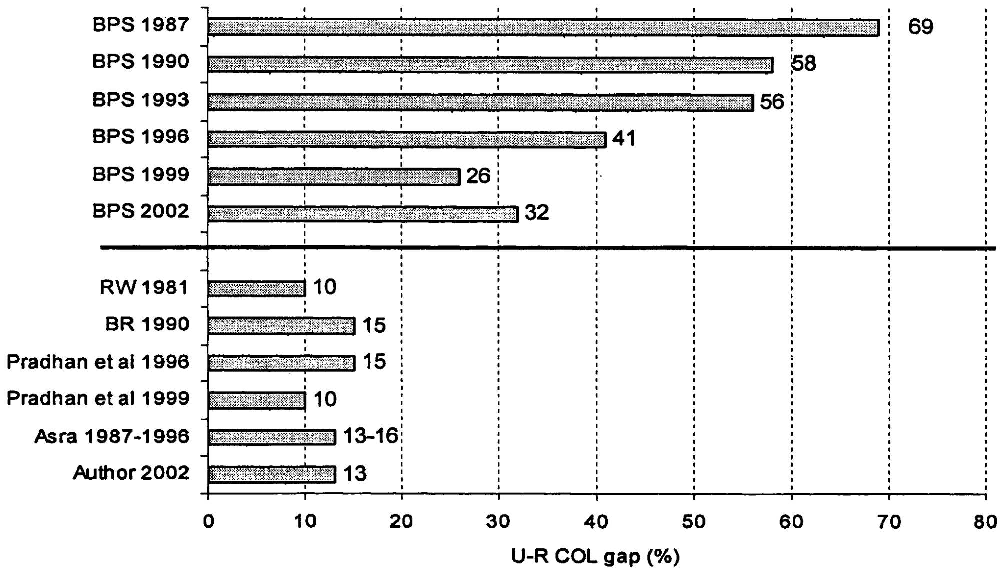
Notes:

- Author's SCOLI are rewritten from Table 4.5.
- The poverty lines estimates by these studies are indexed to rural Indonesia=100 using formulae analogous to formulae for indexing BPS poverty lines in equation 4.2 in this chapter. The provinces are ranked in descending order by the author's rural SCOLI for 2002.

Source: Recalculated from Bidani and Ravallion (1993) and Pradhan et al. (2000; 2001)

Accordingly, the BPS's U-R COL gap can be put in one group and the U-R COL gap from the other studies in another group (see Figure 4.6). The first impression from the figure is the two groups have large different gaps. The BPS's gaps were many times higher than those of all other studies. The second impression is that the BPS's U-R COL gaps have been narrowing over time. This is in contrast with the gaps based on the second group showing the gap was around 10-15 per cent (for the ten surveyed provinces) and seems to have no clear trend.

Figure 4.6: The U-R COL gaps based on several estimates for the ten surveyed provinces 1987-2002



Notes: RW 1981 is the 1981 U-R COL gap based on Ravallion and van de Walle (1991), BR 1990 is the 1990 U-R COL gap based on the Bidani and Ravallion (1993), Pradhan et al. estimates are the 1996 and 1999 U-R COL gaps estimated by Pradhan et al. (2000), Asra 1987-1996 is the average U-R COL gap over the period 1987 to 1996 based on Asra (1999), BPS estimates are the U-R COL gaps implied by BPS poverty lines for the corresponding years and are based on BPS (1999; 2003c).

Source: as cited.

The similarity of the U-R COL gap in the second group is robust. That is, the difference in methodologies applied by the author and by other researchers (within the second group) does not lead to a large discrepancy of the estimated U-R COL gaps. As will be shown in Chapter 5, the author calculated the poverty lines for the ten provinces for 2002 based on the Ravallion low poverty line method and found the U-R COL gap was also 15 per cent. The fact that these studies were carried out in different years and came up with the similar U-R COL gaps can be used as a benchmark for measuring urban inflation rates in comparison to rural inflation rates that will be explored in Chapter 6.

4.5.2. Demonstrating that urban BPS U-R COL gaps are too large

This section argues that the BPS's U-R COL gaps are excessive and that the differences in the BPS poverty lines across regions are not only due to price differences, but also to income differences, so that they tend to be relatively higher in richer regions. In doing so, this section presents three supporting arguments.

First, it is shown in Sub-section 4.5.2.1 that the food price gaps between urban and rural areas implied by the Susenas unit price data, the BPS raw-CPI data and by the author's survey are all far less than the gaps implied by the BPS poverty lines. Admittedly, these comparisons ignore non-food prices (which are not available for the unit price data and are not reliable for the BPS raw-CPI data) but food alone makes up 71.15 per cent of the expenditure of the poor according to Susenas 2002.

Second, in sub-section 4.5.2.2, the author re-estimated the U-R COL gap using *variable weights* for each item across regions instead of using *fixed weights* as has been done so far. That is, the weight for the item in one region is different from the weight for the same item in other regions. This strategy is to follow the idea of the BPS poverty line, which takes into account consumption patterns specific to each region.

Third, in sub-section 4.5.2.3 it is shown by regression analysis that the expenditure of the poor indeed plays an important role in explaining the excessive urban-rural gaps of the BPS food poverty lines.

4.5.2.1. Three different data sources for estimating the food price components of U-R COL gap

The 'ideal' food price index (P^F) can be estimated from these different sources of data:

- P^F based on the author prices, denoted by 'Author's P^F',
- P^F based on unit price derived from Susenas data, denoted by 'unit price P^F', and
- P^F based on BPS raw CPI price data, denoted by 'BPS-price P^F'.

In estimating urban-rural price differences, only P^F is being compared, since the food price index is the only index that can be constructed from all three price data sources, namely the author's survey, Susenas, and BPS raw CPI price data. As mentioned in Section 4.2, the Susenas records both the quantity and the value of total expenditure on food items and therefore an implicit price (a unit price) of food items can be derived. However, the quantities of non-food items consumed are not recorded so that non-food prices cannot be derived in this way. With regard to the BPS raw-CPI price, non-food prices for each region are indeed reported by BPS. Nevertheless, as argued in Section 4.2, the reported prices for non-foods for rural areas are limited and the comparability across provinces not reliable. Therefore, the author uses only food price data to construct 'BPS-price P^F' to compare with the 'author's P^F' and 'unit price P^F'. The comparisons between these three P^F estimates can be seen in Table 4.7.

Table 4.7: Three Food Price Index (P^F) for 2002 based on three different price data sources (Rural =100)

Provinces	The author's price		Unit price		BPS price	
	Urban	Rural	Urban	Rural	Urban	Rural
North Sumatra	111.9	109.7	107.6	104.6	131.5	115.6
North Sulawesi	112.2	106.1	112.5	106.0	131.9	103.5
South Sulawesi	111.6	104.6	106.5	97.7	111.0	105.6
South Sumatra	113.9	104.4	103.2	97.2	106.5	95.6
West Java	116.0	102.3	105.2	104.8	124.6	103.6
West Nusa Tenggara	106.3	98.7	107.1	103.0	117.3	112.3
Lampung	107.7	97.7	107.2	98.1	104.5	93.3
Central Java	105.2	96.5	100.8	98.1	103.6	90.0
East Java	108.3	95.9	98.4	96.1	110.5	100.0
South Kalimantan	112.6	92.5	102.2	99.6	110.0	93.1
Wtg. Avg. 10 prov.	111.1	100.0	103.1	100.0	115.9	100.0
Standard deviation	3.5	5.4	4.0	3.7	10.7	8.5
U-R P^F gap (%)	11.1		3.1		15.9	

Notes:

a) Provinces are ranked in descending order by rural P^F based on author price data. P^F reported in this table is calculated using equation 3.14 of Chapter 3 (i.e., for estimating SCOLI), but is applied for food items only:

$$P^F(j,2002) = \delta\left(\sum_{i=1}^{31} s(i,2002)\frac{p(i,j,2002)}{\overline{p}(i,2002)}\right), \text{ for } j = 1, 2, \ldots, 20.$$

where δ is a constant chosen to make the population weighted average of the term in the bracket of the right hand side equation for rural areas in the ten surveyed provinces equal to 100.

b) The number of items used to calculate 'BPS-price P^F' based on raw-CPI prices was only 20 owing to a lack of food prices in rural areas. The share of each item in this 'BPS-price P^F' is scaled up to get total food share of 71.15 per cent (as for other P^F).

Source: Author's survey, Susenas (Unit prices), and BPS (last two columns).

The urban to rural 'BPS-price P^F' gap was only 15.9 percent, which is far below the BPS U-R COL gap discussed so far. Although this is only the food component of the SCOLI, as food items contribute the major part (71.15 per cent in 2002 Susenas) of the calculation, it is most likely the U-R COL gap as a whole would not change much if non-food items were taken into account. The table also shows the unit price P^F gap is even smaller, i.e., only 3.1 per cent.[8]

4.5.2.2. Variable weights for estimating U-R COL gap

Turning to the second point indicating the implicit BPS U-R COL gap is excessive, the author's SCOLI reported in Table 4.5 were recalculated using *variable weights* across regions, rather than the *fixed weights* used so far. Variable weights means the weight for each item in one region is different from the weight for the same item in other regions. For example, the weight for rice in *urban* North Sumatra is different from the weight for rice in *rural* North Sumatra and other regions. The use of variable weights is to follow the idea of the BPS poverty line. That is, for each region, the BPS poverty line captures the regional specific consumption pattern. The results are presented in Table 4.8.

The results reveal the new U-R COL gap for 2002 was still not as high as implied by the BPS poverty line. The gap increased by only half a percentage point from 12.8 to 13.3 per cent. This shows that the variable item weights are not the cause of the large U-R COL gap. All of this leads to a conclusion that the BPS poverty line indeed has an

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[8] The 'unit price P^F' is a rough comparison, since unit prices derived from the expenditure survey are not a direct substitute for market prices as argued in Section 4.2 of this chapter.

upward bias for urban areas and to a strong belief that the true U-R COL gap is not as high as the BPS poverty line, but rather in the range of from 10 to 15 per cent.

Table 4.8: Recalculated the author's SCOLI for 2002 using variable weights

Province [a]	Fixed weights [b]		Variable weights [c]	
	Urban	Rural	Urban	Rural
N Sulawesi	121.0	113.6	117.6	114.0
N Sumatra	111.4	104.8	109.4	107.1
S Sumatra	111.7	104.5	110.6	103.2
W Java	119.4	103.6	120.8	104.0
W Nusa Tenggara	106.4	100.1	105.7	99.4
S Sulawesi	109.7	100.1	109.6	98.3
C Java	102.9	98.4	103.9	99.0
Lampung	107.4	96.8	109.3	96.6
E Java	113.0	94.9	113.2	94.1
S Kalimantan	111.1	94.4	112.8	95.1
Wtg. Avg. Ten Provinces	112.8	100.0	113.3	100.0
U-R COL gap (%)	12.8		13.3	

Notes:

a) Provinces are ranked in descending order by rural SCOLI fixed shares.

b) The SCOLI in this column are those reported in Table 4.5 and rewritten here to make comparisons easy with the SCOLI using variable shares.

c) For example, share of expenditure (the weight) on rice to total expenditure of households deemed to be poor in *urban* North Sumatra was 19.7 per cent, in *rural* North Sumatra 29.8 per cent, in *urban* Lampung 20.8 per cent, and in *rural* Lampung 26.4 per cent, and so forth. Each region has its own shares, which are different from other regions.

Source: Shares are taken from Susenas 2002; prices of foods are taken from the author's price survey, after backcasting to 2002 as explained in Section 4.4.4.

4.5.2.3. The role of real income in the BPS food poverty line

The last argument showing the BPS U-R COL gap is excessive is to use regression analysis. To show the point, a regression was used to analyze the role of income differences in explaining the implicit P^F implied by the BPS food poverty line for 2002:

$$P_j^{F,BPS} = \beta_0 + \beta_1 P_j^{F,A} + \beta_2 y_j + \varepsilon_j \qquad (4.3)$$

where $P_j^{F,BPS}$ is implicit P^F implied by BPS food poverty lines with the average rural areas of the ten provinces =100 taken from BPS (2003c); $P_j^{F,A}$ is the author's food price index reported in Table 4.7 to represent food prices across regions; and y: real per capita income of people in the reference population used by BPS to estimate the food poverty line. Data for each variable are taken from the ten provinces, so that the total number of observations is 20 (ten from urban areas and another ten from rural areas).

The idea of the regression is that the variations in food poverty lines across regions should be solely attributed to food prices. If this is the case, other variables will not have a significant affect on the variations in the food poverty lines across provinces.

To estimate the regression, the real per capita income was proxied by real per capita expenditure. Theoretically, the estimated BPS food poverty line is located around the per capita food expenditure level of the chosen reference households. Likewise, the non-food poverty line is around the per capita non-food expenditure of the reference households. Hence, the per capita expenditure (food plus non-food) of the reference population is around the estimated BPS poverty line. Therefore, the real per capita expenditure is proxied by a real BPS poverty line (i.e., the BPS poverty line deflated by the author's SCOLI and indexed to average rural of the ten provinces =100).

The estimated coefficients are 0.99 and 0.89 for β_1 and β_2, respectively, and both are significant at the level of 1%. R^2 was 0.92. The restriction of β_2=0 is rejected at the level of 1% significance, indicating the level of real per capita expenditure in explaining the variation in the BPS food poverty line does indeed play an important role.

An alternative measure of per capita expenditure used in the regression was real mean per capita expenditure across all households in the Susenas data. The estimated coefficients are 0.85 and 0.38 for β_1 and β_2, respectively, and they are significant at the level of 5% and 1%. It is clear that the difference in the BPS food poverty line across regions is not only driven by food price differences, but also by income level differences across regions. The income difference driving the BPS U-R COL gap for 2002 was very large.

4.5.3. The ranking of provinces

This sub-section explores the ranking of provinces by the author's SCOLI compared to the ranking by others' studies.

Table 4.9 shows the Spearman rank correlations between the author's SCOLI and other alternative estimates of SCOLI. The author's SCOLI is not only for 2002 (taken from Table 4.5), but also for earlier years up until 1990 estimated by backcasting from the SCOLI for 2002 (steps 6a of Section 3.5, Chapter 3, as will be reported in Chapter 6). The correlation was estimated between the author's SCOLI and others' SCOLI for the same years. For example, it was between the author's SCOLI for 2002 and the implicit BPS's SCOLI for 2002; between the author's SCOLI for 1999 and the implicit BPS's SCOLI for 1999, and also the implicit Pradhan et al's SCOLI for the same years.

As can be seen from Table 4.9, when the full 20 regions observations are used, the author's SCOLI in each Susenas year was closely correlated with the other studies' SCOLI. Each coefficient correlation of the author's SCOLI in each year with other estimates is positively high and statistically significant at the level of 1%, except with BPS's estimate for 1996, which was only significant at 5%. However, when the correlation is applied for urban or for rural regions only, the correlation is very small and insignificant, with the exception of two cases. The lack of significance could be because the number of observations is now too small, but the low correlation coefficients indicate that the reason for the relatively high correlations when all observations are used is the higher SCOLI in urban than in rural regions.

Table 4.9: Spearman rank correlation of the author's SCOLI and other alternative estimates of SCOLI (1990-2002)

	The author's SCOLI [a] (all areas, n=20)					The author's SCOLI (Urban only, n=10)					The author's SCOLI (Rural only, n=10)				
	2002	1999	1996	1993	1990	2002	1999	1996	1993	1990	2002	1999	1996	1993	1990
The implicit BPS's SCOLI															
2002	0.75*					0.5					0.28				
1999		0.63*					-0.03					0.56***			
1996			0.56**					0.22					0.07		
1993				0.58*					0.52					0.08	
1990					0.62*					0.26					0.4
The implicit Pradhan et al's SCOLI															
1999		0.59*					-0.03				0.18				
1996			0.59*					0.2				0.03			
The implicit BR's SCOLI															
2002 [b]	0.89*					0.84*					0.81*				
1990					0.64*					-0.01					0.72*

Notes: *; **; and *** indicate the significance level of 1%, 5%, and 10%, respectively.

a) The author's SCOLI for 1999, 1993, and backwards up until 1987 were estimated by backcasting method from the SCOLI 2002, which will be explored in Chapter 6. The author's SCOLI for 1987 is not in the table, since other alternative estimates of SCOLI reported in this table have no estimates for 1987.

b) The author's estimate based on the Ravallion low poverty line method, which will be explained in Chapter 5.

Source: Author's estimates; BPS (1999; 2003c); Bidani and Ravallion (1993); Pradhan et al. (2000). The 'implicit SCOLIs' in the various studies mean the SCOLIs implicit in the poverty liens used in these studies.

4.6. SCOLI for the non-surveyed provinces

This section details steps 4 and 5 of Section 3.5 of Chapter 3. As explained in that section, the SCOLI for non-surveyed provinces are estimated using the SCOLI for the ten (surveyed) provinces reported in Table 4.5 located next to the non-surveyed provinces. For example, Aceh, West Sumatra, and Riau (non-surveyed provinces) are located in Sumatra and next to North Sumatra (surveyed province), therefore, the SCOLI for urban (rural) areas in these three provinces are estimated based on the SCOLI for urban (rural) areas in North Sumatra with a correction factor for each province.

The correction factors are estimated using the ratio of average food price for *urban* areas of non-surveyed provinces to the average food price for *urban* areas of surveyed provinces. The food bundles used here are the ones used in estimating the food price index reported in Table 4.7, and the prices used are taken from BPS raw-CPI prices for 2002 for all Indonesian provincial capital cities (BPS 2003a). The correction factors are estimated from prices for urban areas only, since the reported prices for rural areas are limited. They are estimated from food prices only, since the comparability of food prices across regions is better than non-food prices as argued in Section 4.2.1. With this correction factor, the size of U-R COL gap for each non-surveyed province for 2002 is assumed to be the same as the size of the gap for the corresponding surveyed province for the same year. For example, the U-R COL gaps for Aceh, West Sumatra, and Riau (estimated from SCOLI for North Sumatra) are necessarily identical to the gap for North Sumatra of 6.3 per cent. The correction factors for each non-surveyed province and the

SCOLI for all regions are shown in Table 4.10. In addition, a comparison between the SCOLI for all regions estimated by the author with the implicit BPS SCOLI is shown in Table 4.11 and Figure 4.7.

The average U-R COL gap across all (surveyed and non-surveyed) regions estimated by the author was 13.3 per cent, not much different from the gap for the ten surveyed provinces only. In contrast, the gap implied by BPS poverty lines was 35.2 per cent. The correlation between the SCOLI estimated by the author and BPS for all regions was 0.57 (n=45). However, when the correlation was estimated for urban only or rural only, the correlation was insignificant.

Table 4.10: Estimating SCOLI 2002 for the regions not surveyed

Block [a)]	Province	Population share 2002		SCOLI for the ten surveyed provinces [b)]		Correction factor [c)]	SCOLI for all regions	
		Urban	Rural	Urban	Rural		Urban	Rural
1	Aceh	0.47	1.43			0.984 [d)]	107.7 [d)]	101.3 [d)]
	N Sumatra *	2.43	3.20	111.4	104.8	1.000	109.4	102.9
	W Sumatra	0.62	1.42			0.958	104.8	98.6
	Riau	1.14	1.37			0.986	107.9	101.5
2	Jambi	0.34	0.83			0.899	98.6	92.3
	S Sumatra *	1.39	2.44	111.7	104.5	1.000	109.7	102.6
3	Bengkulu	0.24	0.54			1.011	106.7	96.2
	Lampung *	0.73	2.52	107.4	96.8	1.000	105.5	95.1
4	Jakarta	3.97	-			1.126	131.9	-
	W Java *	11.44	10.09	119.4	103.6	1.000	117.2	101.7
5	C Java	6.39	8.63	102.9	98.4	1.000	101.1	96.7
	Yogyakarta *	0.89	0.61			1.002	101.3	96.9
6	E Java *	7.17	9.49	113.0	94.9	1.000	111.0	93.2
	Bali	0.82	0.71			1.156	128.4	107.8
7	W Nusa T *	0.75	1.21	106.4	100.1	1.000	104.5	98.3
	E Nusa T	0.30	1.56			1.173	122.5	115.3
8	W Kalimantan	0.50	1.47			1.021	111.3	94.6
	C Kalimantan	0.27	0.65			1.326	144.6	122.9
	S Kalimantan *	0.54	0.90	111.1	94.4	1.000	109.1	92.7
	E Kalimantan	0.70	0.52			1.124	122.6	104.2
9	N Sulawesi *	0.48	0.89	121.0	113.6	1.000	118.8	111.5
	Maluku	0.27	0.67			1.184	140.6	132.0
	Papua	0.24	0.87			1.090	129.6	121.6
10	C Sulawesi	0.21	0.86			1.032	111.2	101.3
	S Sulawesi *	1.17	2.74	109.7	100.1	1.000	107.8	98.2
	S E Sulawesi	0.19	0.71			1.085	116.9	106.6
	INDONESIA	**43.67**	**56.33**	**112.8**	**100**		**113.3**	**100.0**

Notes:

a) There are ten blocks each contains one of the ten surveyed provinces (with * symbol), where the SCOLI for 2002 has been estimated and one or more non-surveyed provinces.

b) The SCOLI for the ten provinces reported in Table 4.5 are rewritten in this column.

c) The correction factors defined in equation 3.15 of Chapter 3, which is repeated here:

$$P(k,2002) = P(j(k),2002)\sum_{i=1}^{31}\left(\frac{s(i,2002)}{\sum_{i=1}^{31}s(i,2002)}\right)\frac{p'(i,k,2002)}{p'(i,j(k),2002)}, \text{ for } k=21, \ldots, 51$$

where s is the Susenas expenditure share on food item (i = 1, 2, ..., 31); k is the non-surveyed regions and $j(k)$ is the most similar surveyed regions with k; $p'(i, k, 2002)$ is the BPS raw-CPI price data for item i in region k in 2002.

d) That is, for example, the relative average food price of urban Aceh to average food price of urban North Sumatra is estimated at 0.984. This adjustment factor is applied for both urban and rural SCOLI of Aceh. Therefore, the urban SCOLI for Aceh is 109.7 (=0.984*111.4) and rural SCOLI for Aceh is 103.2 (=0.984*104.8). Urban and rural SCOLI for all non-surveyed regions are calculated in this way. Population weighted average of these SCOLI does not end up in average rural = 100. The SCOLI reported in last 2 columns are the results of re-base these SCOLI to get Indonesian rural average of 100 (Step 5 of Section 3.5 of Chapter 3). Eventually, the two SCOLI for urban and rural Aceh in example above now become 107.7 and 101.3, respectively.

Source: Author's estimates

Table 4.11: Author's SCOLI and the implicit BPS SCOLI for 2002 (Rural =100)

Provinces a)	SCOLI estimated by the author		SCOLI implied by BPS PL	
	Urban	Rural	Urban	Rural
C Kalimantan	144.6	122.9	126.6	115.2
Maluku	140.6	132.0	-	-
Jakarta	131.9	-	166.6	-
Papua	129.6	121.6	-	-
Bali	128.4	107.8	150.9	122.7
E Kalimantan	122.6	104.2	153.0	141.8
E Nusa T	122.5	115.3	124.3	85.8
N Sulawesi	118.8	111.5	131.8	112.0
W Java	117.2	101.7	130.7	99.9
S E Sulawesi	116.9	106.6	125.1	100.7
W Kalimantan	111.3	94.6	143.3	96.0
C Sulawesi	111.2	101.3	135.3	104.1
E Java	111.0	93.2	127.9	100.5
S Sumatra	109.7	102.6	134.2	95.4
N Sumatra	109.4	102.9	135.3	91.5
S Kalimantan	109.1	92.7	136.1	87.7
Riau	107.9	101.5	144.3	124.3
S Sulawesi	107.8	98.2	124.5	90.7
Aceh	107.7	101.3	-	-
Bengkulu	106.7	96.2	131.4	91.1
Lampung	105.5	95.1	128.7	95.0
W Sumatra	104.8	98.6	151.0	114.0
W Nusa T	104.5	98.3	120.8	94.6
Yogyakarta	101.3	96.9	128.4	106.7
C Java	101.1	96.7	125.9	100.8
Jambi	98.6	92.3	145.2	100.4
INDONESIA	**113.3**	**100.0**	**135.2**	**100.0**
U-R COL gap	13.3		35.2	

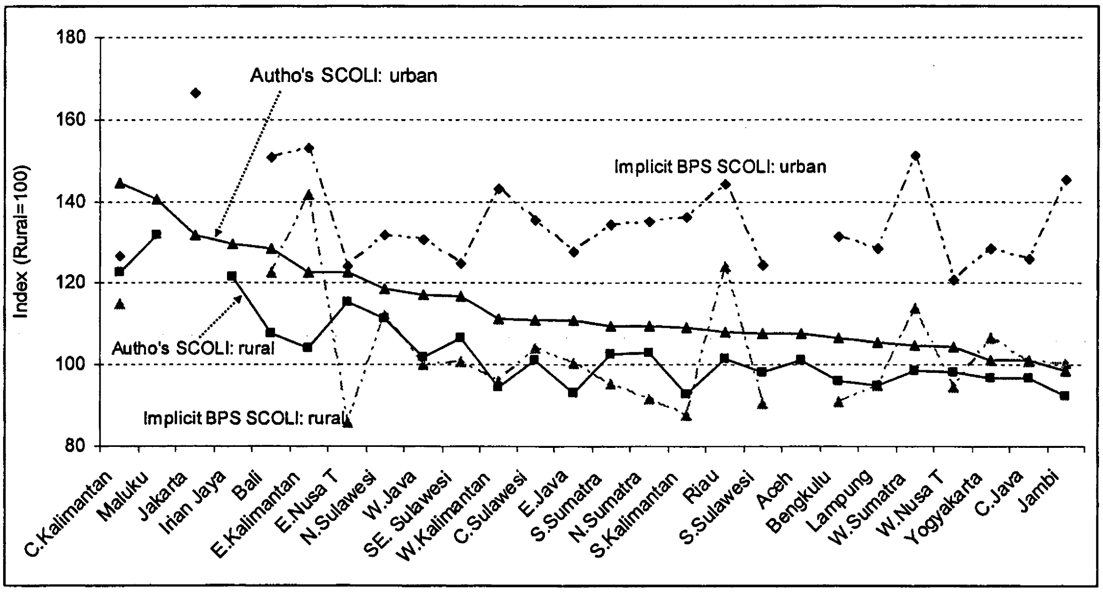
Notes:

a) Provinces are ranked in descending order by the author's *urban* SCOLI.

b) BPS did not report the poverty lines for Aceh, Maluku, and Papua, since the Susenas 2002 was not carried out in these provinces.

Source: Author's estimates, recalculated from (2003e)

Figure 4.7: The author's and the implicit BPS SCOLI for 2002 (Rural=100)



Notes are as for Table 4.11.

Source: Table 4.11

4.7. Summary and conclusions

The main finding from the SCOLI for the ten surveyed provinces is that the average U-R COL gap across provinces was only 13 per cent. This U-R COL gap was more or less consistent with other studies done in Indonesia, except for BPS. The results of studies by Bidani and Ravallion (1993), Pradhan et al. (2000), Ravallion and van de Walle (1991) as well as Asra (1999), implied that the urban to rural difference in poverty line was between 10 and 15 per cent for the ten provinces covered by the author's special survey.

This study demonstrates that the BPS poverty line in urban areas has been too high relative to rural areas. Three pieces of evidence support this point. The first test is from the food component of the U-R COL gap. Replacing the author's *food* prices with *food* prices published by BPS resulted in a food price index only 11 per cent higher in urban than rural areas. As the food basket takes a larger proportion in the consumption basket of the poor, it is most likely the U-R COL gap is not as high as implied by the BPS poverty lines. Given the average food price gap implied by BPS's own data at only 15.9 per cent and that the share of food in the expenditure of the poor is 71 per cent, it would be necessary to assume that non-food prices in urban areas are about 70 per cent higher than in rural areas to generate the overall U-R COL gap of 31.5 per cent implied by the BPS poverty lines for 2002 (Note: 31.5% = 0.71*(15.9%)+0.29*(70.0%). The second test is from applying variable weights. The author re-estimated the SCOLI by using *different weights* (expenditure shares) for different regions, instead of *fixed weights* across regions. The author found the variable weights were not a factor driving the large U-R COL gap implied by the BPS poverty lines. The new U-R COL gap was not much different with the U-R COL gap previously estimated by the author. The third test is from a regression. This demonstrated the large U-R COL gap implied by the BPS poverty line was partly due to average income differences across regions. That is, the variation of food poverty line was not only explained by a variation in food prices, but also by a variation in income.

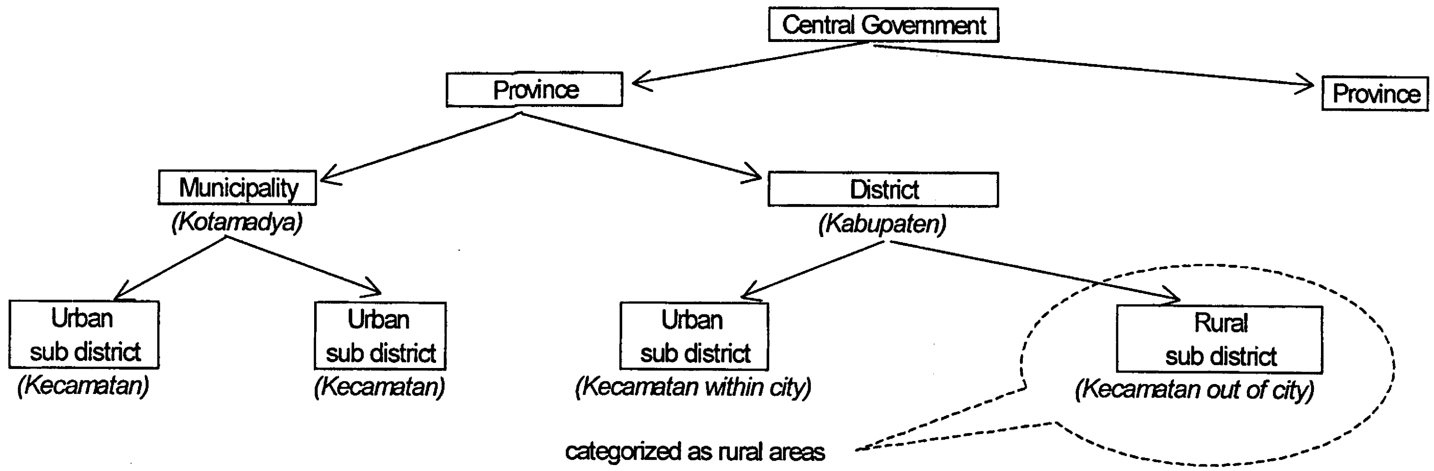
The ranking of provinces by the author's SCOLI in the ten surveyed regions in each Susenas year was strongly correlated with the SCOLI of other researchers. The correlation was estimated between the author's SCOLI and other SCOLI for the same years. Almost all the coefficient correlations between the author's SCOLI and other estimates were positive, high and statistically significant at the 1% level. The correlation was estimated using combined urban and rural regions. However, when the correlation was estimated using urban regions only or rural areas only, the correlation became low and insignificant, indicating the correlation is mainly due to the similar U-R COL gaps found by the author and other studies.

Finally, the SCOLI was estimated for all Indonesian provinces. The average U-R COL gap for all Indonesian provinces was not much different from the U-R COL gap estimated from the ten surveyed provinces. This is almost entirely the result of how the SCOLIs for non-surveyed provinces were constructed. That is, it was assumed the U-R COL gap in each non-surveyed province was equal to the estimated U-R COL gap in a nearby and similar surveyed province. Furthermore, the correlation across provinces between the SCOLI estimated by author and the SCOLI implied by BPS poverty lines for 2002 was positive and significant at the 1% level of significance. However, it again became insignificant once the correlation was estimated for urban or rural areas only.

Appendix 4.1: Description of kecamatan

A short description of Indonesian government administration is needed for a more comprehensive understanding of a *kecamatan* (Figure A4.1). Firstly, the country is divided into 30 provinces (as per the situation in 2002 including 4 new provinces). Second, each of these provincial administrations is divided into several *kota*(s) (municipalities) and *kabupaten*(s) (districts). A municipal administration area typically encompasses one city while a district administration area encompasses one city (district centre), in which the district administration is located, and a large number of villages. Thirdly, both municipal and district areas are further divided into *kecamatan*(s) (sub district), which could be *urban* sub districts or *rural* sub districts. All *kecamatan*(s) in a municipality are *urban* sub districts and *kecamatan*(s) in a district are also *urban* sub districts if they are located in the main city of the district. Others are *rural* sub districts (towns). In relation to the data collection, in most cases, the rural traditional market was located in a *rural* sub district (town) centre (see, Figure A4.1).

Figure A4.1: The structure of Indonesian government relevant to data collection



Appendix 4.2: Food and non-food items covered in the Susenas 2002 and the representatives

Table A4.1: Food items in the Susenas 2002 and food items in the Price survey

No.	Susenas items	Share (%)	No.	Price Survey items [1)]	Share (%)
A	***Cereals***	***24.04***	**A**	***Cereals***	***24.04***
1	Rice	22.81	1	Rice	24.04
2	Glutinous rice	0.05			
3	Fresh corn with husk	0.21			
4	Loosen corn - removed from the cob	0.75			
5	Rice flour	0.05			
6	Corn flour	0.01			
7	Wheat flour	0.14			
8	Other type of grain	0.01			
B	***Tubers***	***1.14***	**B**	***Tubers***	***1.14***
9	Cassava	0.53	2	Cassava	1.14
10	Sweet potato	0.15			
11	Arrowroot	0.06			
12	Taro	0.06			
13	Potatoes	0.13			
14	Dried cassava	0.09			
15	Dried cassava flour	0.10			
16	Cassava flour	0.01			
17	Other type of tubers	0.02			
C	***Fish***	***6.14***	**C**	***Fish***	***6.14***
18	Yellow tail/Fusiliers	0.23			
19	Tuna	0.69	3	Tuna	2.50
20	Mackerel	0.07			
21	*Selar* (Trevally)	0.28			
22	*"Kembung"* (Indian Mackerel)	0.45	4	*"Kembung"* (Indian Mackerel)	1.64
23	Anchovy	0.25			
24	Milk Fish	0.26			
25	Snake Head	0.39			
26	Mozambique Tilapia	0.30			
27	Carp	0.21			
28	Catfish	0.17			
29	Barramundi	0.02			
30	*"Baronang"*	0.02			
31	Others	0.83			
32	Shrimp/Prawn	0.09			
33	Squid/Calamari/Cuttlefish	0.03			
34	Mud crab/Blue swimmer crab	0.01			

Table A4.1: *Continued*

35	Mussel/Snail	0.02			
36	Other fresh fish	0.02			
37	Salted Indian Mackerel	0.21			
38	Salted Mackerel	0.02			
39	Salted Bonito/Tuna/Skipjack Tuna	0.15			
40	Preserved fish: *teri* (Dried salted Anchovy)	0.55	5	Preserved fish: *teri* (Dried salted Anchovy)	2.00
41	Dried salted Trevally	0.10			
42	Dried salted snakeskin gourame	0.17			
43	Salted Milk Fish	0.04			
44	Dried salted Snake Head	0.03			
45	Canned Fish	0.02			
46	Other canned/salted fish	0.47			
47	Dried small shrimp/prawn	0.01			
48	Dried salted squid/cuttlefish	0.00			
49	Other canned/slated shrimp	0.01			
D	***Meat***	***1.27***	***D***	***Meat***	***1.27***
50	Beef	0.20			
51	Buffalo meat	0.02			
52	Lamb	0.08			
53	Pork	0.12			
54	Commercially-bred chicken meat	0.45	6	Commercially-bred chicken meat	1.27
55	Native- chicken meat	0.33			
56	Other poultry	0.01			
57	Other fresh meat	0.02			
58	Beef jerky	0.00			
59	Shredded dried spicy beef	0.00			
60	Canned meat	0.00			
61	Other processed meat	0.00			
62	Liver	0.01			
63	Intestine	0.01			
64	Bits of meats from bones	0.02			
65	Bones	0.01			
66	Other kind of meat	0.00			
E	***Eggs and Milk***	***2.29***	***E***	***Eggs and Milk***	***2.29***
67	Commercially- chicken eggs	1.23	7	Commercially- chicken eggs	1.53
68	Native-chicken eggs	0.40	8	Native-chicken eggs	0.49
69	Duck eggs	0.18			
70	Quail eggs	0.01			
71	Other kind of eggs	0.01			
72	Salted eggs	0.04			
73	Fresh whole milk	0.01			
74	Long-life milk	0.01			
75	Sweetened Condensed Milk	0.21	9	Sweetened Cond. Milk	0.27
76	Canned powdered milk	0.06			
77	Baby's powdered milk	0.14			
78	Cheese	0.00			
79	Other dairy product	0.00			

Table A4.1: *Continued*

F	***Vegetables***	***6.85***	***F***	***Vegetables***	***6.85***
80	Spinach	0.42	10	Spinach	0.67
81	*Kangkong*/Water spinach	0.44			
82	Cabbage	0.18			
83	White boc-choy	0.03			
84	Bok-choy	0.06			
85	String beans	0.09			
86	Snake beans	0.56	11	Snake beans	0.90
87	Tomatoes	0.25			
88	Carrot	0.04			
89	Cucumber	0.11			
90	Cassava leaves	0.48	12	Cassava leaves	0.77
91	Eggplant	0.29			
92	Bean sprout	0.08			
93	Pumpkin/squash	0.10			
94	Baby corn	0.02			
95	Mixed-vegetables for stir fry	0.10			
96	Mixed-vegetables for sour/coconut spicy soup	0.13			
97	Young jackfruit	0.10			
98	Young papaya	0.11			
99	Mushroom	0.02			
100	*Petai* beans	0.04			
101	Stinky beans (*jengkol*)	0.05			
102	Shallots	0.93	13	Shallots	1.50
103	Garlic	0.48	14	Garlic	0.78
104	Red Chilies	0.67	15	Red Chilies	1.08
105	Small Chilies	0.08	16	Green Chilies	1.15
106	Asian small super hot chilies	0.71			
107	Canned vegetables	0.00			
108	Other kind of vegetables	0.26			
G	***Pulses***	***2.75***	***G***	***Pulses***	***2.75***
109	Unshelled peanuts	0.12			
110	Shelled peanuts	0.10			
111	Soybean	0.03			
112	Mung bean	0.12			
113	Cashew Nuts	0.00			
114	Other type of nuts	0.05			
115	Tofu	0.97	17	Tofu	1.16
116	*Tempe* (Fermented soybean)	1.33	18	*Tempe*	1.59
117	*Tauco* (cultured soybean paste)	0.01			
118	*Oncom* (cultured soy cake)	0.01			
119	Other kind of legumes	0.00			
H	***Fruits***	***2.31***	***H***	***Fruits***	***2.31***
120	Oranges	0.12			
121	Mango	0.04			

Table A4.1: *Continued*

122	Apple	0.02			
123	Avocado	0.02			
124	*Rambutan*	0.62			
125	Lanzon / *lansep (duku)*	0.17			
126	Durian	0.11			
127	Snake skin fruit/*Zalacca (Salak)*	0.08			
128	Pineapple	0.04			
129	Ambones' Banana	0.19			
130	Raja banana	0.16			
131	Other type of bananas	0.40			
132	Papaya	0.12	19	Papaya	2.31
133	Guava	0.02			
134	Sapodilla/Sapo (*sawo*)	0.01			
135	Star fruits	0.00			
136	Spanish plum	0.01			
137	Watermelon	0.03			
138	Melon	0.00			
139	Jackfruit	0.04			
140	Tomatoes	0.01			
141	Canned fruit	0.00			
142	Other fruits	0.10			
I	***Oil and fat***	***3.53***	***I***	***Oil and fat***	***3.53***
143	Cooking oil	1.32	20	Cooking oil	2.18
144	Corn Oil	0.01			
145	Other frying oil	1.36			
146	Coconut	0.82	21	Coconut	1.35
147	Margarine	0.01			
148	Other oil/fat	0.02			
J	***Beverages ingredients***	***4.21***	***J***	***Beverages ingredients***	***4.21***
149	Granulated sugar	2.50	22	Granulated sugar	3.09
150	Cane sugar	0.29			
151	Tea	0.47			
152	Powdered coffee	0.91	23	Powdered coffee	1.12
153	Chocolate drink	0.01			
154	Cocoa powder	0.00			
155	Syrup/cordial	0.01			
156	Other drinks	0.01			
K	***Spices***	***2.09***	***K***	***Spices***	***2.09***
157	Salt	0.36	24	Salt	1.08
158	Candlenut	0.14			
159	Coriander	0.12			
160	Pepper	0.17	25	Pepper	0.51
161	Tamarind	0.17	26	Tamarind	0.50
162	Nutmeg	0.01			
163	Cloves	0.01			
164	Fish paste	0.26			
165	Soya sauce	0.20			

Table A4.1: *Continued*

166	Monosodium glutamate	0.42			
167	Chili/tomato sauce	0.01			
168	Instant spices	0.03			
169	Other spices	0.17			
L	***Other food consumed***	***1.14***	***L***	***Other food consumed***	***1.14***
170	Crackers	0.31			
171	*Emping* (crackers)	0.01			
172	Fresh noodle	0.02			
173	Instant noodle	0.71	27	Instant noodle	1.14
174	Rice noodle	0.01			
175	Macaroni/dried noodle	0.03			
176	Jelly powder	0.01			
177	Instant baby porridge	0.02			
178	Other kind of food	0.02			
M	***Processed food***	***6.27***	***M***	***Processed food***	***6.27***
179	White bread	0.07			
180	Sweet bread/other type of bread	0.30			
181	Snacks/cookies	0.18			
182	Boiled/steamed snacks	0.64			
183	Fried snacks	0.79			
184	Mung bean porridge	0.09			
185	*Gado-gado* and other salad with peanut dressings	0.25			
186	Rice with varies veggies/meat dishes	0.87			
187	Fried rice	0.06	28	Fried rice	0.40
188	Steamed rice	0.09			
189	Rice cakes with veggies *laksa*	0.14			
190	"Soto"/goulash/soup/*"rawon"*	0.13			
191	Satay/ *"tongseng"*	0.04			
192	Meat ball/boiled/ fried noodle	0.82	29	Meat ball	5.87
193	Instant noodle	0.05			
194	Snacks for kids/ crisps/crispy chips	0.66			
195	Fish (fried, baked, fermented, steam etc)	0.04			
196	Chicken/meat (fried, baked, etc)	0.03			
197	Ice cream	0.03			
198	Other ice	0.28			
199	Other prepared foods	0.42			
200	Soft drink with CO2 (soda)	0.01			
	Beverages without CO2:				
201	Packaging water	0.00			
202	Packaging tea	0.00			
203	Package of fruit essence	0.00			
204	Health drink/energetic drinks	0.01			
205	Other drinks (coffee, coffee milk, tea, chocolate milk)	0.28			
N	***Alcohol beverage***	0.08	***N***	***Alcohol beverage*** 2)	-
206	Beer	0.01			
207	Wine	0.01			

Table A4.1: *Continued*

208	Other alcohol beverages	0.06			
O	***Tobacco and betel***	***7.04***	***O***	***Tobacco and betel***	***7.13***
209	Filtered clove cigarette	2.92	30	Filtered clove cigarette	3.77
210	Non-filtered clove cigarette	2.61	31	Non-filtered clove cigarette	3.36
211	Menthol Cigarette	0.30			
212	Tobacco	0.80			
213	Betel leaves/areca nut	0.19			
214	Other	0.22			
	TOTAL FOOD	***71.15***		***TOTAL FOOD***	***71.15***

Note: Susenas 2002 has price and expenditure data on 214 separate food items collected from all provinces in Indonesia, excluding Aceh, Maluku, North Maluku, and Papua. As in the explanation for equation 3.14 (Chapter 3), the share of food item *i* is the ratio of per capita spending on item *i* to total spending of households deemed to be poor in all provinces.

1) For example, for cereals, rice is the only cereal item in the price survey. So, the whole share of cereals, 24.04, is attributed to rice. Similarly for tubers. For fish, there are 3 items in the price surveys. So, the total share of fish from Susenas of 6.14 is divided between these 3 items in price survey in proportion to their weights of each item in Susenas. Thus, for example, the share in price survey of Tuna is 2.50 = [{6.14/(0.69+0.45+0.55)}0.69].

2) The price survey does not include this sub group. Its share is combined with the tobacco and betel sub group.

Source: Susenas 2002, Author's calculation

Table A4.2: Non-food items in the Susenas 2002 and non-food item in Price survey

No.	Items from Susenas	Share (%) 1	No	Price survey	Share (%)1
P	***Housing and facility***	***14.38***	***P***	***Housing and facility*** 2)	***14.54***
215	Estimated monthly rental for owned house	6.34	32	Estimated monthly rental for owned house	9.22
216	Maintenance costs	0.24			
217	Electricity: (expenditure)	1.62	33	Electricity	2.35
218	Telephone	0.01			
219	Water ("PAM"): expenditure	0.11			
220	LPG: expenditure	0.03			
221	City gas: expenditure	0.00			
222	Kerosene: expenditure	2.04	34	Kerosene	2.97
223	Generator: expenditure	0.01			
224	Generator: Lubricant oil expenditure	0.00			
225	Generator: maintenance cost	0.00			
226	Charcoal: expenditure	0.00			
227	Firewood and other fuels	3.02			
228	others (flashlight, storage batteries, etc)	0.70			
Q	***Good and services***	***6.69***	***Q***	***Good and services*** 2)	***6.94***
229	Bathing soap, toothpaste, toothbrush, and shampoo	1.54	35	Bathing soap	1.63
			36	Toothpaste	1.76
230	Beauty products (perfume, pomade, deodorant, powder, nail clippers, lipstick, comb, etc), and sanitary napkin	0.53	37	Facial Powder	0.63
			38	Sanitary napkin	0.54
231	Treatment of skin, face, nails, hair (expenses of cutting, curl, cream bath, *'lulur'* (herbal cosmetics used to lighten of skin, etc)	0.20			

Table A4.2: *Continued*

	Health				
232	Government hospital	0.10			
233	Private hospital	0.06			
234	Medical Doctor practice	0.11			
235	*Puskesmas* (Community Health Centre)	0.09			
236	Supporting *Puskesmas*	0.05			
237	Clinic/"Mother and Child's Clinic"/Health Clinic "BP"	0.01			
238	*Posyandu* (Integrated Health Services Post)/Cadre	0.01			
239	Midwife/paramedic/practice nurses	0.21			
240	Traditional healer/*Shinshe* (Chinese traditional healer)	0.04			
241	Purchased medicine with medical doctor prescription	0.02			
242	Own treatment/purchased medicine without medical doctor prescription/purchased herbs as a medicine	0.33			
	Other health:				
243	Pregnancy treatment cost	0.02			
244	Delivery cost	0.14			
245	Immunization cost for children under 5 years	0.01			
246	Check-up and using contraceptive costs	0.19			
247	Health treatment (vitamin, herb, massage, fitness, etc)	0.11			
	Expenses of school & courses				
248	Donation for school development (down payment of school enrollment)	0.09			
249	School fee (SPP) and BP3/POMG contribution (tuition)	0.78			
250	Other school contribution (skill education, additional lesson, test, etc.)	0.08			
251	Textbooks/photo copy of textbooks	0.21			
252	Stationers (calculator, *'jangka'* = compass for describing circle, etc)	0.24			
253	Course's fee	0.01			
254	Newspapers, magazines, books, and stationery (outside of school and courses needs) including rents of magazines/literatures	0.01			
255	Postal, Telegram, public phone, and post materials, including pager contribution	0.02			

Table A4.2: *Continued*

	Fuel of motor vehicle used for household needs (not for business/working)				
256	Gasoline: expenditure	0.21			
257	Solar fuel: expenditure	0.00			
258	Lubricant oil: expenditure	0.06			
259	Maintenance and repairs of motor vehicle (brake oil, water for car battery, car battery, etc)	0.05			
260	Costs of transportation (bus, train, airline, ship, *'becak'* (pedicab), parking fee, toll fee, etc)	1.08	39	Transportation	2.38
261	Hotel, motel, cinema, play, sport, decoder, and other recreation, (excluded transportation cost and purchase of goods for recreation)	0.02			
262	House maid and driver (wages or salary)	0.00			
263	Other goods (tissue, camphor, banana leaves, coconut leaves, stick for 'sate', etc)	0.01			
264	Other services (Identity card, Driver license, birth certificate, photo copy, photo, etc)	0.07			
R	***Clothes, footwear and head gear***	***5.35***	***R***	***Clothes, footwear and head gear*** [2)]	***5.60***
265	Ready made man's wear (Blazer, long-sleeved shirt, Jacket, sarong, pants, T-shirt, underwear, etc)	0.94	40	Sarong	0.10
			41	T-Shirt	1.14
266	Ready made woman's wear (Gown, long fabric, blouse, nightgown, sweater, skirt, sarong, shawl, *"angkin"* (cloth waistband), underwear, etc)	1.01	42	Nightgown	0.65

Table A4.2: *Continued*

			43	Bra	0.68
267	Ready made children's wear (clothes, pants, sweater, shirts, under wear, baby napkin, etc)	0.91	44	School uniform	1.21
268	Materials/fabrics for man, woman, and children (wool, polyester, cotton, silk, etc)	0.11			
269	Sewing cost, fixed the clothes, thread, and other stuffs of sewing needs	0.04			
270	Footwear for man (shoes, sandal, sock, etc)	0.27			
271	Footwear for woman (slippers, shoes, sandal, etc)	0.24			
272	Footwear for children	0.26			
273	Head gear for man, woman and children (hat, *'kopiah"* =rimless cap, veil, etc)	0.08			
274	Laundry-soap (in bar form, powder, cream, and liquid)	1.37	45	Powdered detergent	1.81
275	Material of clothing maintenance (Softener, whitener, starch and other clothing maintenance)	0.03			
276	Others (towel, belt, shoe polish, tie, tailor-fee, small hanger, etc)	0.08			
S	***Durable goods***	***1.35***	**S**	***Durable goods*** 2)	***1.77***
277	Furniture's (table, chair, bed, wardrobe, showcase, long-shelf, mirror, kitchen cabinet, baby bed, etc)	0.17	46	Chair	0.21
278	Household facilities (sewing machine, refrigerator, fan, washing machine, Air condition, etc)	0.01			
279	Supporting household utensils (mattress, pillow, table cloth, bed sheet, ashtray, pillow sheet, blanket, plaited mat, curtain, carpet, etc)	0.15	48	Mattress	0.40
280	Household utensils (Iron, broom, scissors, knife, machete, saw, vacuum cleaner, hanger, soldering tools, etc)	0.16			
281	Kitchen/eaten utensils (plate's rack, stove, cooking pot, pan, pail, wok, spoon, thermos bottle, plate, glass, mixer, blender, microwave, oven and other utensils made of glass, ceramic, melamine, and plastic)	0.36	49	Stove	0.94

Table A4.2: *Continued*

282	Decoration goods (wall decoration, aquarium, decoration goods made of ceramic, porcelain, onyx, marble, wood, etc)	0.01			
283	Repaired of utensils, supporting and instruments household	0.03			
284	Watch, clock, camera, glasses, video camera, other optic tools and its repaired	0.02			
285	Umbrella, bag, luggage, and its repaired	0.04			
286	Expensive jewelers made of metal and gold (gold, diamond, pearl, etc) and its repaired	0.11			
287	Children's toy and its repaired	0.04			
288	Television, video, radio, cassette, radio cassette, guitar, piano/organ, computer, and its repaired	0.11			
289	Sport utensils (chess, racket, ball, net, bet, stick, including swim trunk, shoes for playing soccer/roller shoes, glasses for swimming, etc) and its repaired	0.00			
290	Vehicle (bicycle, motor cycle, car, etc) and large repairs	0.05			
291	Pets and plants including the maintenance expenses	0.05			
292	Other durable goods (cradle, baby carriage, electric installation, telephone, pipe, pager, and its repairs)	0.04			
T	***Taxes and insurance***	***0.32***	***T***	***Taxes and insurance***	-
293	Building and Land tax (PBB)	0.17			
294	Radio & TV tax, and its type	0.01			
295	Vehicle (motor and non motor) tax	0.05			
296	Other tax/levied (Household, garbage, safety, grave, etc)	0.09			
297	Accident & loss, and health insurance	0.00			
U	***Festival and ceremony***	***0.76***	***U***	***Festival and ceremony***	-
298	Wedding (rents of tools such as wedding equipment's chair, tend, plate, etc and services such as bride, and expenses for bride make up maker, the priest, and hall rents, etc)	0.07			

Table A4.2: *Continued*

299	Circumcision, birthday (expenses for professional circumciser, doctor/paramedics/traditional circumciser, balloon, food in a box, ribbon/paper for decoration, rent for chairs, hall & entertainment rents).	0.05			
300	Religious festival (*'Qurban'* festival, offering, etc)	0.38			
301	Hajj expenses				
302	Other traditional ceremony (invite *"ustadz"* (Moslem teacher which expert in religion), Priest, making offering, etc)	0.20			
303	Burial expenses (cost of bathing the body, material to cover the body, service of digging the soil, coffin, cost of crematorium, cost of *'ngaben'* (fire ceremony of Hindus), etc)	0.06			
	TOTAL NON-FOOD	***28.85***		**TOTAL NON FOOD**	**28.85**
	TOTAL SHARES	***100.00***		***TOTAL SHARES***	***100.00***

1) See notes on Table A4.1

2) Two sub groups of non-food items in Susenas are excluded in the price survey, i.e., "tax and insurance" and "festival and ceremony". Their share in Susenas is split into other non food sub groups in the price survey. The Susenas share of "tax and insurance", i.e., 0.32, is split equally into two sub groups: "housing and facilities" share and "durable goods" share in Price survey, while the Susenas share of "festival and ceremony", i.e., 0.76, is split equally into three sub groups: "good and services", "clothing", "durable goods". Thus, in the price survey, the share of housing changes to 14.54 (=14.38+0.16); the share of "good and services" changes to 6.94 (=6.69+0.25); the share of "clothing" changes to 5.60 (=5.35+0.25); and the share of "durable goods" changes to 1.77 (=1.35+0.16+0.25). Accordingly, the share in price survey of estimated rental cost of housing is 9.22 =[14.54/(6.34+1.62+2.04)]*6.34.

Source: Susenas 2002, Author's calculation

Appendix 4.3: The questionnaire for fieldwork

Table A4.3: The questionnaire used for fieldwork

	Province:	date:	urban	rural
	Items	unit	price	price
	FOOD			
1	Rice (INSINYUR)	kg		
	Rice (BENGAWAN)	kg		
2	Cassava	kg		
3	Commercially bred chicken eggs	kg		
4	Native chicken eggs	piece		
5	Sweetened condensed milk (INDOMILK)	can		
	Sweetened condensed milk (BENDERA)			
6	Cooking oil	kg		
7	Granulated sugar	kg		
8	Powdered coffee (KAPAL API 75 gr)	sachet		
	Powdered coffee (GLATIK 60 gr)	sachet		
9	Salt (smooth powdered)	1/4 kg		
	Salt (cube)			
10	Coconut	piece		
11	Instant noodle (INDOMIE KARI AYAM)	sachet		
	Instant noodle (SARIMIE)			
12	*"Kembung"* fish	kg		
13	Tuna FRESH	kg		
14	Preserved Teri (half cm wide and brown)	1/4 kg		
	Other dried fish			
15	Purebred chicken: WHOLE	kg		
16	Pepper	1/2 ounces		
17	Tamarind: PEELED	1/4 kg		
18	Shallot: IN PIECES and MEDIUM SIZE	1/4 kg		
19	Garlic	1/4 kg		
20	Red Chilli (BIG and STRIGHT, not curly)	1/4 kg		
21	Small Chilli (MIXED RED and GREEN)	1/4 kg		
22	Tofu: 10 PIECES	10 pieces		
23	Fermented soy bean	piece		
24	Papaya	kg		
25	Spinach	bundle		
26	Snake bean	bundle		
27	Cassava leaves	bundle		
28	Fried rice	plate		
29	Meat ball noodle/ Pang Sit noodle	bowl		
30	Filtered clove cigarette (GG Surya 12 bar)	sachet		
31	Non-filtered clove cigarette (GG Merah king size;12 bar)	pack		
	Non-filtered clove cigarette (Jarum 76;12 bar)	pack		

Table A4.3: *Continued*

	Items	unit	price	price
	NON-FOOD			
32	Rental cost of housing	month		
33	Electricity	kw		
34	Kerosene (RETAIL)	litre		
35	Soap (GIV)	piece		
	Soap (LIFEBUOYE)	piece		
	Toothpaste (PEPSODENT medium size)	piece		
	Toothpaste (RITADENT medium size)	piece		
36	Detergent (RINSO 32 gr, POWDER)	sachet		
	Detergent (SO KLIN 40 gr, POWDER)	sachet		
37	Facial powder (VIVA POWDER: sachet, 10 gr)	sachet		
	Sanitary napkin (HERS)	pack		
	Sanitary napkin (LAURIEL GREEN)	pack		
38	Transportation cost (within city, one ride, around 6-10 KM)	person		
39	"Sarong" cloth (GAJAH DUDUK)	piece		
	T-Shirt	piece		
40	Nightgown	piece		
	Bra	piece		
41	School uniform (primary school, year 4, PORNOMO)	piece		
42	Table and chair (lounge room, plastic)	1 set		
	Wardrobe (plywood, two doors (one with mirror), 180 cm height)			
43	Mattress (single; 90 cm x 190 cm)	piece		
44	Kerosene Stove (capacity 2. Litre; 20 wicks)	piece		

House characteristics:
No car access
Well water supply
Permanent or semi permanent house
Lounge room, one bed room, and kitchen
Cement floor

Note: Permanent house means house walls are made from brick while semi permanent means only half of the wall is made from brick and the other half from timber. The half made from timber is usually around one meter from the ground.

The questionnaire contains more than 59 items even though the selected items to be included in the price survey are only 49 (as shown in Table 4.4 in the main text). Some items are represented by two brands, such as those numbered 5, 8, 9 and so forth. The purpose of doing this is that if a particular item cannot be found in a particular province, the price can be approximated using another brand. So, at the early stage of the price survey, all item prices were collected to observe which of each item was mostly available in all traditional markets. And later on, only the price of mostly available items was collected.

Appendix 4.4: Notes on how to record prices

Both rice and coconut oil are sold in kilos, except for some provinces where they are sold in litres. In this case, the price of rice was recorded in kilos. The conversion used for rice when sold in litres instead of kilogram is 1kg = 1.25 litres, as used by BPS and practiced in rural markets in East Java. Say the price of rice in liters was Rp 2,500, the price in kilos would be Rp 3,125. Likewise, the conversion for cooking oil from litres to kilograms (vice versa) is 1kg = 1.11 litres.

Also in some provinces (South Kalimantan, North Sulawesi, South Sulawesi and North Sumatra), commercially-bred chicken eggs are sold per egg. The conversion for eggs is 1 kg = 16 eggs meaning, on average, 1 kg of eggs contains around 16 eggs of mixed sizes. So if the price of different size of eggs was 500, 550, 600, 650, and 700 Rupiah per egg, the kilo price is the average of these listed prices at Rp 9,600 (Rp 666 average egg price).

This also applies for other items such as cassava, fish, tamarind, and others whenever they are not sold in the units as indicated in Table 4.4 in the main text , the prices are adjusted to get the unit indicated. For example, instead of being sold in kilos, in some provinces (North Sulawesi and South Sulawesi), cass ava and fish has been sold in pieces. The recorded price of cassava is the price for all pieces (say Rp 3000) divided by the weight (say 4 kg). So, the price in kilos is Rp 750.

Many items were sold in different unit of measurements across regions such as pepper; tamarind; vegetables, especially spinach, legumes, and leaves of cassava; fish;

cassava; and many others. For example, pepper is often sold in small hand made sachets, which almost ensure the sachet size in one region is different from other regions. Likewise, the vegetables are sold in bunches. In some markets they are sold in one bunch and in some others in two or three bunches. To convert the price of each these items collected from the markets into prices per unit of measurement as indicated in the questionnaire, the author used a scale during the survey. The use of the scale is as follows. For example, if the price of pepper per sachet was Rp 3000 and the weight was 0.6 ounce,[1] the recorded price in ½ ounce (as indicated unit in questionnaire) would be Rp 2500 (=(Rp 3000/6)*5).

The recorded prices for vegetables that usually fluctuate, such as chillies, garlic, and shallots, are the average prices of the particular vegetable during the last three days of the interview. If an item's price had increased over these last three days, the recorded price is the previous price on the assumption that increases are only short run, e.g., as due to a short term delay in transportation. For example, the price of small chilli at the time of the data collection was Rp 4,000/kg while the normal price during the week had been 2000/kg. The recorded price is therefore Rp 2,000/kg.

[1] In daily market activities, 1 ounce equals 100 g (= 0.1 kg).

Appendix 4.5: Adjustments for selected non foods items

Table A4.4: Adjustments for cost of house rent

House	E Java		C Java		S Kalimantan		N Sulawesi		S Sulawesi		W Nusa T		Lampung		S Sumatra		N Sumatra		W Java	
Characteristic	urban	rural	urban	rural	urban	rural	urban	rural	urban	rural	urban	rural	urban	rural	urban	rural	urban	rural	urban	rural
Rental cost a)	150	500	800	900	100	70	2000	1750	1000	600	80	750	1000	800	1500	100	1750	500	2000	125
Monthly (M) or Yearly (Y)	M	Y	Y	Y	M	M	Y	Y	Y	Y	M	Y	Y	Y	Y	M	Y	Y	Y	M
Cost per month a)	150	42	67	75	100	70	167	146	83	50	80	63	83	67	125	100	146	42	167	125
Own or rent	rent	own	rent	rent	rent	rent	rent	rent	own	own	rent	rent	rent	rent	rent	rent	rent	rent	rent	rent
Permanent/semi	Y	Y	Y	Y	timber	timber	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Cement Floor	Y	Y	Y	Y	timber	timber	Y	Y	Y	Y	Y	Y	Y	tile)c	Y	Y	Y	Y	Y	tile)d
Car access	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	Y
Water supply	well	well	well	well	PDAM	well	PDAM	well	well	well	PDAM	well	well	well	PDAM	well	PDAM	well	well	well
Electricity	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Private bathroom	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y
Estimated size (m)	5 x 9	4x10	4 x10	5 x10	4 x 10	7 x 4	8 x 6	6 x10	4 x 9	5 x9	4 x 8	3 x7	7 x 4	4 x8	4 x10	4 x8	5 x10	4 x8	4 x10	6 x7
Terrace	Y	Y	Y	Y	Y	N	N	N	N	N	Y	Y	N	Y	N	Y	N	Y	Y	Y
Lounge room	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Bed room	2	1	1	1	1	1	2	2	1	1	1	1	1	1	2	1	2	1	1	1
Private kitchen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Estimated quality index b)	120	100	100	120	100	90	120	130	100	110	100	80	90	100	115	100	130	100	105	110
Estimated rental cost per month a)	125	42	67	63	100	78	139	112	83	45	80	78	93	67	109	100	112	42	159	114

Note:

a) The unit is thousand Rupiahs.

b) Basically, the index is estimated by author's judgment based on the physical characteristics as set out in the questionnaire, rather than using an exact formula. Firstly, a house with a size of 32-40 square meters, one bed room and other characteristics as in the questionnaire, and with "standard appearance" as in Figure 4.4 is indexed by 100. The index varies according to the variation of home characteristics especially the number of bedroom and the home size.

c) *Tegel* (cement type of tile)

d) Ceramic tile

- PDAM stands for *Perusahaan Daerah Air Minum* (i.e., Local government owned water supply enterprise).

Source: Author's survey

Table A4.5: Adjustments for cost of wardrobe price

Wardrobe Characteristic	E Java		C Java		S Kalimantan		N Sulawesi		S Sulawesi		W Nusa T		Lampung		S Sumatra		N Sumatra		W Java	
	urban	rural	urban	rural	urban	rural	urban	rural	urban	rural	urban	rural	urban	rural	urban	rural	urban	rural	urban	rural
Price (Rp 000) [a] Plywood [b]	200 thin	235 thin	200 thin	225 thin	250 local	225 local	450 thick	500 thick	235 local	210 local	475 thick	500 thick	300 local	300 local	300 local	250 local	300 local	350 local	350 thick	225 thick
Estimated quality index [c]	100	100	100	100	100	100	150	150	100	100	150	150	100	100	100	100	100	100	150	150
Estimated price (Rp 000)	200	235	200	225	250	225	300	333	235	210	317	333	300	300	300	250	300	350	233	150

Notes:

a) The price excludes transportation cost from the store to the buyer's home,

b) "thick" plywood category refers to plywood with a double thickness that is assigned to 50% higher quality than standard plywood based on the price difference between "thin" and "thick" plywood wardrobes in Surabaya.

c) The standard wardrobe is two doors, one with mirrors. The size is 175-180 cm high, about 140 cm wide and around 40 cm deep. All sides are made from smooth and shiny plywood, except for the back of wardrobe which is made of plain plywood. A local wood made wardrobe is considered standard. During the survey, local wood wardrobes were the cheapest amongst the same size.

Source: Author's survey

Table A4.6: Adjustments for plastic chair price

Plastic chair	E Java		C Java		S Kalimantan		N Sulawesi		S Sulawesi		W Nusa T		Lampung		S Sumatra		N Sumatra		W Java	
	urban	rural	urban	rural	urban	rural	urban	rural	urban	rural	urban	rural	urban	rural	urban	rural	urban	rural	urban	rural
Price (Rp 000) [a]	120	142	135	120	165	155	175	180	175	160	185	160	165	150	175	170	240	225	135	120
With hand bar?	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N
Estimated quality index [b]	80	80	80	80	100	100	100	100	100	100	100	100	100	100	100	100	100	100	80	80
Estimated price (Rp000)	150	177.5	169	150	165	155	175	180	175	160	185	160	165	150	175	170	240	225	169	150

Notes:

a) The price excludes transportation cost from the store to the buyer's home

b) The standard chair is one with a hand bar. The chair without a hand bar is assigned 80% of standard based on the price difference between the two in Surabaya. The brands are ignored and considered more or less as the same quality.

Source: Author's survey

Table A4.7: Adjustments for mattress price

Mattress	E Java		C Java		S Kalimantan		N Sulawesi		S Sulawesi		W Nusa T		Lampung		S Sumatra		N Sumatra		W Java	
	urban	rural	urban	rural	urban	rural	urban	rural	urban	rural	urban	rural	urban	rural	urban	rural	urban	rural	urban	rural
Price (Rp 000)*	140	137.5	75	80	90	100	90	140	50	40	125	125	70	50	80	70	100	115	250	70
Size (90cmx190cm)	Y	Y	Y	Y	80x 190	Y	Y	150 x 190	80x 190	80x 190	Y	Y	Y	80x 190	Y	80x 190	Y	Y	90x2 00	70x 190
Thickness (standard)	Y	Y	Thin	thin	Y	Y	Y	Y	thin	thin	Y	Y	thin	thin	Y	Y	Y	Y	Thick	Y
Estimated quality index	100	88	76	76	88	100	100	167	76	76	100	100	88	76	100	88	100	100	156	77
Estimated price (Rp 000)	140	156	99	105	102	100	90	84	66	53	125	125	80	66	80	80	100	115	160	91

Notes:

a) The standard size is 90 cm wide and 190 cm length. The other size is normalized to standard. The thin mattress is assigned to have 12 percentage points lower than the standard based on price difference between the standard and a thin mattress in South Kalimantan. Mattresses in urban West Java are very thick, and estimated to have double thickness. So they are indexed 50% higher than standard and another 6 percentage points adjustment for slightly larger size.

Source: Author's survey

Table A4.8: Adjustments for stove price

Stoves	E Java		C Java		S Kalimantan		N Sulawesi		S Sulawesi		W Nusa T		Lampung		S Sumatra		N Sumatra		W Java	
	urban	rural	urban	rural	urban	rural	urban	rural	urban	rural	urban	rural	urban	rural	urban	rural	urban	rural	urban	rural
Price (Rp 000)	30	30	35	35	35	20	40	30	30	25	17.5	17.5	30	30	30	30	30	30	25	20
Wicks	20	20	20	20	18	20	20	20	20	20	20	20	20	20	20	20	16	16	20	20
Estimated quality index a)	100	100	100	100	90	100	100	100	100	100	100	100	100	100	100	100	80	80	100	100
Estimated price (Rp 000)	30	30	35	35	39	20	40	30	30	25	17.5	17.5	30	30	30	30	38	38	25	20

Notes:

a) The standard stove in the questionnaire is one with 20 wicks and two litres kerosene capacity, and either hand made or local brand stove. The adjustment is based on the number of wicks which represents the capacity.

Source: Author's survey

Appendix 4.6: The recorded prices along with adjustment prices of durable goods

Table A4.9: The recorded price from survey (Rp 000)

	Items	Unit	E Java		C Java		S Kalimantan		N Sulawesi		S Sulawesi		W Nusa T		Lampung		S Sumatra		N Sumatra		W Java	
			urb	rural	urb	rural	urb	rural	urb	rural	urb	rural	urb	rural	urb	rural	urb	rural	urbn	rural	urb	rural
	Cereal																					
1	Local rice	Kg	2.70	2.50	2.90	2.50	2.75	2.13	3.00	2.63	3.13	2.88	2.60	2.50	3.30	3.20	3.30	3.25	3.40	3.40	3.10	3.00
	Tuber																					
2	Cassava	Kg	0.70	0.65	0.55	0.50	0.70	0.65	0.75	0.75	1.00	0.70	0.75	0.40	0.50	0.70	1.00	0.50	0.70	0.75	0.80	0.70
	Fish																					
3	Tuna	kg	10.00	7.50	9.00	8.75	12.00	8.50	6.00	7.14	9.92	8.33	14.50	12.00	12.50	12.00	10.00	10.00	9.00	8.00	12.00	10.00
4	"Kembung"	Kg	12.00	7.00	7.50	6.73	14.00	14.00	6.81	6.81	7.69	6.67	10.00	na	15.00	12.00	12.00	12.00	11.00	12.00	14.00	10.00
5	Preserved Teri	Ounce	2.00	2.50	2.10	1.75	3.00	3.20	2.40	1.76	2.80	1.90	3.00	2.26	2.50	1.60	2.00	1.70	2.00	2.40	2.50	2.00
	Meat																					
6	Commercially-bred Chicken meat	Kg	12.50	14.00	12.00	12.50	13.00	15.50	11.00	12.00	12.00	14.00	15.00	14.50	13.50	10.83	14.00	14.00	17.00	16.50	15.00	14.00
	Egg and milk																					
7	Commercially-bred Chicken eggs	Kg	6.80	7.50	8.00	7.50	9.00	8.70	9.00	9.60	10.50	10.40	8.00	8.00	7.50	7.20	6.70	7.50	7.84	8.00	8.00	7.80
8	Native-chicken eggs	Piece	1.00	0.65	0.75	0.60	1.00	0.80	1.50	1.00	0.85	0.85	0.80	0.75	1.00	0.75	1.00	1.00	1.50	1.00	1.00	1.00
9	Sweetened condensed milk	Can	5.20	5.20	5.50	5.50	5.20	5.40	5.00	5.30	5.20	5.50	5.00	5.50	5.25	5.50	5.50	5.80	5.30	5.20	5.40	5.20
	Vegetables																					
10	Spinach	Kg	1.00	1.25	1.50	1.00	2.00	0.40	2.00	2.20	1.67	2.50	3.34	1.25	3.75	0.80	5.00	2.50	1.67	1.00	2.50	2.00
11	Snake bean	Kg	2.50	4.00	3.00	3.00	6.25	6.00	4.00	2.00	6.67	6.67	4.00	5.00	6.00	5.00	4.00	4.00	4.00	4.00	3.00	1.50
12	Cassava leaves	Kg	2.25	0.84	1.25	0.75	1.33	0.67	1.00	1.25	0.77	1.25	1.67	0.50	1.50	0.80	2.50	1.25	1.50	1.11	2.50	1.25
13	Shallots	Ounce	0.60	0.60	0.60	0.60	0.80	0.60	0.80	1.20	0.60	0.75	1.10	0.80	0.80	0.60	0.70	0.70	0.60	0.80	0.80	0.60
14	Garlic	Ounce	0.50	0.50	0.60	0.60	0.60	0.60	0.70	0.60	0.60	0.60	0.50	0.60	0.60	0.50	0.60	0.70	0.60	0.60	0.60	0.48
15	Red Chilies	Ounce	0.50	0.40	0.40	0.40	1.40	0.80	1.50	1.00	0.80	0.70	0.90	0.80	1.40	1.20	1.00	0.80	0.80	1.00	1.40	1.00
16	Small Chilies	Ounce	0.60	0.50	0.40	0.40	1.40	0.80	1.60	2.20	1.60	0.70	0.90	1.40	0.60	0.40	1.40	1.00	1.20	1.20	1.00	0.80

Table A4.9: *continued*

	Item	unit	E Java		C Java		S Kalimantan		N Sulawesi		S Sulawesi		W Nusa T		Lampung		S Sumatra		N Sumatra		W Java	
			urban	rural	urb	rural	urb	rural	urb	rural	urb	rural	urb	rural	urb	rural	urb	rural	urb	rural	urb	rural
	Pulses																					
17	*Tofu*	Kg	2.86	1.43	3.14	2.14	3.57	2.14	2.14	1.79	1.43	1.43	2.86	2.04	2.86	1.00	3.57	3.57	3.57	3.57	2.86	2.86
18	*Tempeh*	Kg	2.86	2.86	2.86	2.14	2.86	2.14	2.86	2.86	4.29	4.29	2.86	2.86	2.86	2.86	4.29	2.86	2.86	2.86	2.86	2.86
	Fruits																					
19	Papaya	Kg	1.50	1.25	1.00	1.00	2.00	1.00	1.00	1.00	1.50	1.00	0.67	0.75	1.33	1.33	2.00	1.50	0.88	0.75	2.50	1.25
	Oil and Fats																					
20	Cooking oil	Litre	4.50	4.50	4.14	4.50	4.70	5.00	4.95	4.50	5.06	5.06	4.50	4.50	4.05	4.05	4.50	4.50	3.87	3.78	4.05	4.05
21	Coconut	Piece	2.75	1.75	1.75	1.50	1.30	1.25	1.35	1.20	1.50	1.10	1.25	1.40	1.20	1.00	1.50	1.00	1.50	2.00	1.50	1.50
	Beverage ingredients																					
22	Granulated sugar	Ounce	0.45	0.42	0.46	0.45	0.50	0.52	0.50	0.52	0.50	0.52	0.55	0.50	0.53	0.51	0.53	0.53	0.68	0.50	0.52	0.52
23	Powdered coffee	Ounce	2.20	2.00	2.67	2.67	2.93	2.93	2.67	2.50	2.67	2.93	3.33	3.33	3.20	2.93	3.33	3.33	1.33	1.33	2.67	2.67
	Spices																					
24	Salt	Ounce	0.20	0.13	0.14	0.14	0.20	0.10	0.14	0.20	0.12	0.10	0.20	0.20	0.10	0.10	0.14	0.10	0.20	0.10	0.12	0.10
25	Pepper	Ounce	2.50	3.00	4.00	3.00	4.00	5.00	5.00	5.00	3.00	5.00	2.50	3.00	3.00	3.00	5.00	5.00	4.00	4.00	3.00	3.00
26	Tamarind	Ounce	0.50	0.40	0.40	0.30	0.60	0.40	0.63	0.94	0.40	0.50	0.60	0.33	0.60	0.40	0.60	0.60	1.00	1.00	1.00	0.70
	Other food consumed																					
27	Instant noodle	Pack	0.95	0.85	1.00	1.00	1.00	0.80	1.00	1.00	1.00	0.90	0.90	0.90	1.00	1.00	0.90	0.90	0.95	1.00	1.00	1.00
	Processed food																					
28	Fried rice	Plate	4.00	3.50	3.50	3.50	3.00	2.50	3.50	3.00	3.00	3.00	4.00	3.00	4.00	3.00	3.50	3.00	4.50	3.50	3.00	2.50
29	Meat ball/pang sit noodle	Bowl	4.00	3.00	3.50	3.50	3.00	2.50	3.50	3.00	3.00	3.00	2.00	2.00	2.50	2.50	3.00	2.50	3.50	3.50	3.00	2.50
	Tobacco and betel																					
30	Filtered clove cigarette	Bar	0.38	0.40	0.42	0.42	0.42	0.42	0.46	0.46	0.38	0.42	0.38	0.38	0.46	0.46	0.47	0.47	0.46	0.46	0.50	0.48
31	Non-filtered clove cigarette	Bar	0.32	0.33	0.33	0.33	0.33	0.33	0.38	0.38	0.33	0.33	0.32	0.32	0.38	0.33	0.33	0.33	0.33	0.33	0.33	0.32

Table A4.9: *continued*

	Item	Unit	E Java		C Java		S Kalimantan		N Sulawesi		S Sulawesi		W Nusa T		Lampung		S Sumatra		N Sumatra		W Java	
			urb	rural	urb	rural	urb	rural	urb	rural	urb	rural	urb	rural	urb	rural	urb	rural	urb	rural	urb	rural
	Housing and its facilities																					
32	Estimated rental cost	Month	125.0	41.7	66.7	62.5	100.0	77.8	138.9	112.2	83.3	45.5	80.0	78.1	92.6	66.7	108.7	100.0	112.2	41.7	158.7	113.6
33	Electricity	Kw	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39
34	Kerosene	Litre	1.00	1.00	1.10	1.20	1.30	1.30	1.50	1.50	1.20	1.10	1.50	1.50	1.30	1.30	1.20	1.40	1.40	1.30	1.20	1.10
	Good and services																					
35	Bath soap	Piece	1.00	0.85	1.00	0.90	1.00	1.00	1.00	1.25	1.00	1.00	0.80	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.85
36	Toothpaste	Piece	2.20	3.20	2.20	2.25	2.00	2.10	2.50	2.50	2.20	2.00	2.00	2.10	2.25	2.10	2.20	2.50	2.20	2.50	2.20	2.00
37	Facial powder	Sachet	0.50	0.40	0.50	0.50	0.60	0.50	1.00	0.75	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	1.00	0.50	0.50
38	Sanitary napkins	Pack	2.90	2.70	2.75	2.75	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	2.80	2.80	2.50	2.50
39	Transportation	Person	1.20	1.50	1.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Clothes, footwear, head gear																					
40	"Sarong" Cloth	Piece	35.0	30.0	27.0	30.0	27.5	30.0	30.0	40.0	24.0	25.0	25.0	37.0	27.5	27.5	30.0	25.0	30.0	35.0	25.0	30.0
41	T-shirt	Piece	17.0	15.0	20.0	15.0	15.0	19.0	15.0	20.0	17.5	15.0	20.0	18.0	20.0	20.0	18.5	20.0	25.0	25.0	15.0	15.0
42	Nightgown	Piece	25.0	25.0	24.0	30.0	20.0	27.0	22.5	22.5	20.0	27.5	20.0	15.0	25.0	15.0	27.5	22.0	25.0	25.0	25.0	20.0
43	Bra	Piece	8.0	5.0	7.5	1.0	6.0	7.0	6.0	5.0	6.0	5.0	5.0	6.0	4.0	5.0	6.0	5.0	2.5	5.0	5.0	5.0
44	School uniform (top)	Piece	20.0	20.0	13.5	15.0	15.0	15.0	12.5	15.0	12.5	12.0	17.5	12.0	15.0	15.0	12.5	15.0	12.5	20.0	12.5	12.5
45	Powdered detergent	Sachet	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.5	0.5	0.5
	Durable goods																					
46	Plastic chair	Set	150.0	177.5	168.8	150.0	165.0	155.0	175.0	180.0	175.0	160.0	185.0	160.0	165.0	150.0	175.0	170.0	240.0	225.0	168.8	150.0
47	Wardrobe	Piece	200.0	235.0	200.0	225.0	250.0	225.0	300.0	333.3	235.0	210.0	316.7	333.3	300.0	300.0	300.0	250.0	300.0	350.0	233.3	150.0
48	Mattress	Piece	140.0	156.3	98.7	105.3	102.3	100.0	90.0	83.8	65.8	52.6	125.0	125.0	79.5	65.8	80.0	79.5	100.0	115.0	160.3	90.9
49	Stove	Piece	30.0	30.0	35.0	35.0	38.9	20.0	40.0	30.0	30.0	25.0	17.5	17.5	30.0	30.0	30.0	30.0	37.5	37.5	25.0	20.0

Source: Author's survey

Appendix 4.7: Fieldwork time table

Table A4.10: Time table of collecting data in ten provinces

No	Province	Location	Schedule
1	East Java	Urban: *Pasar* Pacar Keling, *Pasar* Tambak Rejo, and *Pasar* Turi in Surabaya. Rural: *Pasar* Sembayat, *Pasar* Bungah, and *Pasar* Sedayu in *Kabupaten* Gresik	Week 4 November 2004
2	Central Java	Urban: *Pasar* Johar in Semarang Rural: *Pasar* Jimbaran, *Pasar* Bandungan in *Kabupaten* Semarang	Week 4 and 5 Nov 2004
3	South Kalimantan	Urban: *Pasar* Anyar in Banjarmasin Rural: *Pasar* Astambul in *Kabupaten* Banjar Baru	Week 2, December 2004
4	North Sulawesi	Urban: *Pasar* Bersehati in Manado Rural: *Pasar* Airmadidi in *Kabupaten* Noth Minahasa	Week 3, December 2004
5	South Sulawesi	Urban: *Pasar* Pa' Baeng-Baeng in Makassar (it used to be Ujung Pandang) Rural: *Pasar* Bili-Bili, *Pasar* Balang-Balang, and *Pasar* Limbung in *Kabupaten* Sungguminasa	Week 4, December 2004
6	West Nusa Tenggara	Urban: *Pasar* Cakranegara and *Pasar* Sindu in Mataram Rural: *Pasar* Narmada, *Pasar* Kediri in *Kabupaten* Lombok Barat	Week 5, December 2004
7	Lampung	Urban: *Pasar* Gintung, *Pasar* SMEP, and *Pasar* Bambu Kuning in Bandar Lampung Rural: *Pasar* Gadingrejo in *Kabupaten* Tenggamus	Week 2, January 2005
8	South Sumatra	Urban: *Pasar* Cinde, *Pasar* KM5, and *Pasar* 16 Ilir in Palembang Rural: *Pasar* Bitung in *Kabupaten* Banyuasin	Week 3, January 2005
9	North Sumatra	Urban: *Pasar* Limun in Medan Rural: *Pasar* Pancur Batu in *Kabupaten* Deli Serdang	Week 4, January 2005
10	West Java	Urban: *Pasar* Astana Anyar and *Pasar* Andir in Bandung Rural: *Pasar* Balai Endah, *Pasar* Ciparay in *Kabupaten* Bandung	Week 5, January 2005

Appendix 4.8: Deflators used to estimate 2002 prices

Table A4.11: CPI in each provincial capital city during the survey (2002=100)

No.	Deflator	Nov. 2004		Dec. 2004				Jan. 2005			
		E Java	C Java	S. Kal	N. Sul	S.Sul	W.Nus	Lamp.	S.Sum	N.Sum	WJava
1	Food: Cereal, Cassava and their Products	104	102	112	104	102	99	121	114	112	108
2	Food: Meat and it's Products	110	119	117	96	103	116	102	130	121	112
3	Food: Fresh Fish	115	117	149	122	105	101	106	126	135	117
4	Food: Preserved Fish	122	96	114	105	126	107	121	114	113	115
5	Food: Eggs, Milk and their Products	105	105	103	107	113	104	110	108	112	104
6	Food: Vegetables	101	100	91	116	128	124	125	134	134	122
7	Food: Beans and Nuts	137	147	108	115	112	111	120	106	109	113
8	Food: Fruits	111	114	145	111	121	100	109	119	101	108
9	Food: Spices	92	95	114	152	109	119	109	105	92	119
10	Food: Fats and Oils	130	127	126	116	125	119	117	135	121	120
11	Food: Other foods Items	98	103	107	90	105	106	124	113	125	101
12	PF: Prepared Food	109	111	109	108	116	115	119	124	111	133
13	PF: Tobacco and Alcohol Beverages	111	111	111	116	111	113	116	108	112	108
14	Housing: Cost for Housing	114	125	144	105	115	118	130	137	142	128
15	Housing: Fuel, Electricity and Water	125	149	139	126	135	138	143	138	135	141
16	Housing: Household Equipment	103	100	100	107	105	105	108	105	108	100
17	Household Operation	118	121	106	110	106	108	114	117	116	117
18	Clothing: For Men	109	104	97	111	106	106	123	116	117	107
19	Clothing: For Women	102	110	105	115	107	101	109	111	109	103
20	Clothing: For Children	112	106	114	116	108	103	104	124	111	103
21	Health: Beauty Treatment	129	109	123	107	112	120	110	132	119	127
22	TC: Transport Equipment and Support	118	110	131	101	135	117	112	117	134	116

Source: Recalculated from CEIC Asia database dx for Windows

Table A4.12: Matching CPI's for urban deflators and items to deflate

No.	Deflators in urban areas	To deflate items:
1	Food: Cereal, Cassava and their Products	Rice and cassava
2	Food: Meat and it's Products	Commercially bred Chicken
3	Food: Fresh Fish	"*Kembung*" and tuna
4	Food: Preserved Fish	Preserved teri
5	Food: Eggs, Milk and their Products	Eggs and condensed milk
6	Food: Vegetables	Spinach, snake bean, cassava leaves, shallot, garlic, red chili, and small chili
7	Food: Beans and Nuts	Tofu and *tempeh* (fermented soy)
8	Food: Fruits	Papaya
9	Food: Spices	Salt, pepper, and tamarind
10	Food: Fats and Oils	Cooking oil and coconut
11	Food: Other foods Items	Granulated sugar, and powdered coffee
12	PF: Prepared Food	Instant noodle, fried rice, meat ball/ pang sit noodle
13	PF: Tobacco and Alcohol Beverages	Filtered and non-filtered clove cigarette
14	Housing: Cost for Housing	Estimated rental cost of house
15	Housing: Fuel, Electricity and Water	Kerosene
16	Housing: Household Equipment	Plastic chair, wardrobe, mattress, and stove
17	Housing: Household Operation	Detergent
18	Clothing: For Men	Sarong and T-shirt
19	Clothing: For Women	Nightgown and bra
20	Clothing: For Children	School uniform (top)
21	Health: Beauty Treatment	Bath soap, toothpaste, face powder, and napkins
22	Transport Equipment and Support	Transportation

Appendix 4.9: Estimated prices for 2002

Table A4.13: Estimated prices for 2002 (Rp 000)

	Items	Unit	E Java		C Java		S Kalimantan		N Sulawesi		S Sulawesi		W Nusa T		Lampung		S Sumatra		N Sumatra		W Java	
			urb	rural	urb	rural	urb	rural	urb	rural	urb	rural	urb	rural	urb	rural	urb	rural	urbn	rural	urb	rural
	Cereal																					
1	Local rice	Kg	2.59	2.40	2.85	2.46	2.46	1.90	2.88	2.52	3.05	2.81	2.63	2.53	2.73	2.65	2.91	2.86	3.04	3.04	2.86	2.77
	Tuber																					
2	Cassava	Kg	0.67	0.62	0.54	0.49	0.63	0.58	0.72	0.72	0.98	0.68	0.76	0.40	0.41	0.58	0.88	0.44	0.63	0.67	0.74	0.65
	Fish																					
3	Tuna	kg	8.67	6.50	7.71	7.50	8.04	5.70	4.92	5.58	9.41	7.91	14.41	11.92	11.81	11.34	7.95	9.54	6.69	5.95	10.3	8.58
4	"Kembung"	Kg	10.4	6.1	6.4	5.77	9.4	9.4	5.6	5.9	7.3	6.3	9.9	5.77	14.2	11.3	9.5	8.0	8.2	8.9	12.0	8.6
5	Preserved Teri	Ounce	1.64	2.05	2.18	1.81	2.64	2.81	2.29	1.68	2.22	1.51	2.81	2.12	2.06	1.32	1.75	1.49	1.77	2.12	2.18	1.74
	Meat																					
6	Commercially-bred Chicken meat	Kg	11.4	12.7	10.1	10.5	11.1	13.3	11.4	12.4	11.6	13.6	12.9	12.5	13.3	10.6	10.8	10.8	14.1	13.7	13.4	12.5
	Egg and milk																					
7	Commercially-bred Chicken eggs	Kg	6.49	7.15	7.64	7.16	8.76	8.46	8.38	8.94	9.27	9.18	7.72	7.72	6.82	6.54	6.19	6.93	7.03	7.17	7.69	7.50
8	Native-chicken eggs	Piece	0.95	0.62	0.72	0.57	0.97	0.78	1.40	0.93	0.75	0.75	0.77	0.72	0.91	0.68	0.92	0.92	1.34	0.90	0.96	0.96
9	Sweetened condensed milk	Can	4.96	4.96	5.25	5.25	5.06	5.25	4.66	4.94	4.59	4.85	4.83	5.31	4.77	5.00	5.08	5.36	4.75	4.66	5.19	5.00
	Vegetables																					
10	Spinach	Kg	0.99	1.24	1.50	1.00	2.20	0.44	1.73	1.90	1.30	1.95	2.70	1.01	3.01	0.64	3.72	1.86	1.24	0.74	2.06	1.64
11	Snake bean	Kg	2.47	3.96	3.01	3.01	6.89	6.61	3.46	1.73	5.20	5.20	3.23	4.04	4.81	4.01	2.98	2.98	2.98	2.98	2.47	1.23
12	Cassava leaves	Kg	2.23	0.83	1.25	0.75	1.47	0.73	0.86	1.08	0.60	0.98	1.35	0.40	1.20	0.64	1.86	0.93	1.12	0.83	2.06	1.03
13	Shallots	Ounce	0.59	0.59	0.60	0.60	0.88	0.66	0.69	1.04	0.47	0.59	0.89	0.65	0.64	0.48	0.52	0.52	0.45	0.60	0.66	0.49
14	Garlic	Ounce	0.49	0.49	0.60	0.60	0.66	0.66	0.60	0.52	0.47	0.47	0.40	0.49	0.48	0.40	0.45	0.52	0.45	0.45	0.49	0.39
15	Red Chilies	Ounce	0.49	0.40	0.40	0.40	1.54	0.88	1.30	0.86	0.62	0.55	0.73	0.65	1.12	0.96	0.74	0.60	0.60	0.74	1.15	0.82
16	Small Chilies	Ounce	0.59	0.49	0.40	0.40	1.54	0.88	1.38	1.90	1.25	0.55	0.73	1.13	0.48	0.32	1.04	0.74	0.89	0.89	0.82	0.66

Table A4.9: *continued*

	Item	unit	E Java		C Java		S Kalimantan		N Sulawesi		S Sulawesi		W Nusa T		Lampung		S Sumatra		N Sumatra		W Java	
			urban	rural	urb	rural	urb	rural	urb	rural	urb	rural	urb	rural	urb	rural	urb	rural	urb	rural	urb	rural
	Pulses																					
17	*Tofu*	Kg	2.09	1.04	2.14	1.46	3.31	1.98	1.87	1.56	1.28	1.28	2.56	1.83	2.38	0.83	3.36	3.36	3.27	3.27	2.52	2.52
18	*Tempeh*	Kg	2.09	2.09	1.95	1.46	2.65	1.98	2.49	2.49	3.83	3.83	2.56	2.56	2.38	2.38	4.03	2.69	2.62	2.62	2.52	2.52
	Fruits		1.36	1.13	0.88	0.88	1.38	0.69	0.90	0.90	1.24	0.82	0.67	0.75	1.23	1.23	1.69	1.26	0.87	0.74	2.30	1.15
19	Papaya	Kg	1.50	1.25	1.00	1.00	2.00	1.00	1.00	1.00	1.50	1.00	0.67	0.75	1.33	1.33	2.00	1.50	0.88	0.75	2.50	1.25
	Oil and Fats																					
20	Cooking oil	Litre	3.46	3.46	3.27	3.56	3.72	3.96	4.29	3.90	4.03	4.03	3.78	3.78	3.45	3.45	3.33	3.33	3.21	3.13	3.37	3.37
21	Coconut	Piece	2.11	1.35	1.38	1.19	1.03	0.99	1.17	1.04	1.20	0.88	1.05	1.18	1.02	0.85	1.11	0.74	1.24	1.66	1.25	1.25
	Beverage ingredients																					
22	Granulated sugar	Ounce	0.46	0.43	0.45	0.44	0.47	0.49	0.56	0.58	0.47	0.49	0.52	0.47	0.42	0.41	0.46	0.47	0.54	0.40	0.51	0.51
23	Powdered coffee	Ounce	2.24	2.04	2.59	2.59	2.74	2.74	2.96	2.78	2.53	2.78	3.15	3.15	2.57	2.36	2.94	2.94	1.07	1.07	2.64	2.64
	Spices																					
24	Salt	Ounce	0.22	0.14	0.15	0.15	0.17	0.09	0.09	0.13	0.11	0.09	0.17	0.17	0.09	0.09	0.13	0.09	0.22	0.11	0.10	0.08
25	Pepper	Ounce	2.71	3.25	4.20	3.15	3.49	4.37	3.28	3.28	2.75	4.58	2.11	2.53	2.74	2.74	4.74	4.74	4.35	4.35	2.52	2.52
26	Tamarind	Ounce	0.54	0.43	0.42	0.32	0.52	0.35	0.41	0.62	0.37	0.46	0.51	0.28	0.55	0.37	0.57	0.57	1.09	1.09	0.84	0.59
	Other food consumed																					
27	Instant noodle	Pack	0.87	0.78	0.90	0.90	0.91	0.73	0.93	0.93	0.86	0.77	0.79	0.79	0.84	0.84	0.72	0.72	0.86	0.90	0.75	0.75
	Processed food																					
28	Fried rice	Plate	3.68	3.22	3.16	3.16	2.74	2.29	3.25	2.79	2.58	2.58	3.49	2.62	3.35	2.51	2.81	2.41	4.05	3.15	2.26	1.88
29	Meat ball/pang sit noodle	Bowl	3.68	2.76	3.16	3.16	2.74	2.29	3.25	2.79	2.58	2.58	1.75	1.75	2.10	2.10	2.41	2.01	3.15	3.15	2.26	1.88
	Tobacco and betel																					
30	Filtered clove cigarette	Bar	0.34	0.36	0.37	0.37	0.38	0.38	0.39	0.39	0.35	0.38	0.33	0.34	0.39	0.39	0.43	0.43	0.41	0.41	0.46	0.44
31	Non-filtered clove cigarette	Bar	0.28	0.30	0.30	0.30	0.30	0.30	0.32	0.32	0.30	0.30	0.28	0.29	0.32	0.29	0.31	0.31	0.30	0.30	0.31	0.30

Table A4.9: *continued*

	Item	Unit	E Java		C Java		S Kalimantan		N Sulawesi		S Sulawesi		W Nusa T		Lampung		S Sumatra		N Sumatra		W Java	
			urb	rural	urb	rural	urb	rural	urb	rural	urb	rural	urb	rural	urb	rural	urb	rural	urb	rural	urb	rural
	Housing and its facilities																					
32	Estimated rental cost	Month	109	36	53	50	69	54	132	107	72	39	68	66	71	51	79	73	79	29	124	88
33	Electricity	Kw	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39
34	Kerosene	Litre	0.80	0.80	0.74	0.81	0.94	0.94	1.19	1.19	0.89	0.82	1.09	1.09	0.91	0.91	0.87	1.01	1.04	0.97	0.85	0.78
	Good and services																					
35	Bath soap	Piece	0.78	0.66	0.92	0.83	0.81	0.81	0.93	1.17	0.89	0.89	0.67	0.71	0.91	0.91	0.76	0.76	0.84	0.84	0.79	0.67
36	Toothpaste	Piece	1.71	2.49	2.02	2.06	1.62	1.71	2.34	2.34	1.97	1.79	1.66	1.75	2.05	1.92	1.67	1.90	1.86	2.11	1.74	1.58
37	Facial powder	Sachet	0.39	0.31	0.46	0.46	0.49	0.41	0.93	0.70	0.45	0.45	0.42	0.42	0.46	0.46	0.38	0.38	0.42	0.84	0.40	0.40
38	Sanitary napkins	Pack	2.25	2.10	2.52	2.52	2.44	2.44	2.80	2.80	2.68	2.68	2.50	2.50	2.74	2.74	2.28	2.28	2.36	2.36	1.98	1.98
39	Transportation	Person	1.10	1.37	0.92	1.85	0.95	0.95	0.94	0.94	0.94	0.94	1.09	0.91	0.92	0.92	0.84	0.84	0.82	0.82	0.84	0.84
	Clothes, footwear, head gear																					
40	"Sarong" Cloth	Piece	32.1	27.5	25.9	28.8	28.4	31.0	27.1	36.1	22.6	23.6	23.5	34.8	22.4	22.4	25.9	21.6	25.7	30.0	23.3	28.0
41	T-shirt	Piece	15.6	13.8	19.2	14.4	15.5	19.6	13.5	18.1	16.5	14.2	18.8	16.9	16.3	16.3	16.0	17.3	21.4	21.4	14.0	14.0
42	Nightgown	Piece	24.5	24.5	21.9	27.4	19.0	25.7	19.5	19.5	18.7	25.8	19.8	14.9	22.9	13.8	24.8	19.8	23.0	23.0	24.2	19.4
43	Bra	Piece	7.8	4.9	6.8	0.9	5.7	6.7	5.2	4.3	5.6	4.7	5.0	5.9	3.7	4.6	5.4	4.5	2.3	4.6	4.8	4.8
44	School uniform (top)	Piece	17.9	17.9	12.7	14.2	13.1	13.1	10.8	13.0	11.6	11.1	16.9	11.6	14.4	14.4	10.1	12.1	11.2	18.0	12.2	12.2
45	Powdered detergent	Sachet	0.3	0.3	0.3	0.4	0.5	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	Durable goods																					
46	Plastic chair	Set	146	172	170	151	166	156	163	168	167	153	176	152	152	139	167	163	221	208	169	151
47	Wardrobe	Piece	194	228	201	226	251	226	280	311	224	200	301	317	277	277	287	239	277	323	234	151
48	Mattress	Piece	136	152	99	106	103	100	84	78	63	50	119	119	73	61	77	76	92	106	161	91
49	Stove	Piece	25	25	29	29	37	19	36	27	28	24	16	16	26	26	26	26	32	32	21	17

Source: Author's survey

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Chapter 5

How Important Are Data on Non-food Prices in Estimating Poverty?

5.1. Introduction

As discussed in Section 3.4.2 of Chapter 3, standard neo classical consumer theory predicts both the Ravallion lower and upper poverty line (LPL and UPL) will generate upward biased poverty lines for regions with relatively high food prices compared to those for regions with relatively low food prices. This is not a criticism of Ravallion's methods, which were proposed to deal with situations where non-food prices are not available. In the absence of data on non-food prices it is not possible to estimate a utility consistent poverty line and therefore some approximation such as Ravallion's must be adopted. However, the author's survey described in Chapter 4 does yield data on non-food as well as on food prices. In this chapter these data are used to answer these two questions relating to the Ravallion methods: are the biases predicted by theory observed in practice? and, if so, how large were these biases in Indonesia in 2002? If the biases are substantial, then it is important to collect data on non-food prices as well as food prices. If the biases are small poverty lines can be approximated quite well by using Ravallion's methods without data on non-food prices. The main objective of this chapter is to see whether the theoretical reasons for expecting the bias are borne out in practice.

To explore these issues, the Ravallion LPL and UPL for the ten surveyed provinces (20 regions in total, i.e., 10 provinces by urban and rural areas) in 2002 are estimated using the author's food bundle and price data. These poverty lines are then indexed to average rural ten provinces =100 and compared with the author's SCOLI (Table 4.5, Chapter 4). The poverty incidence estimated by the various methods is compared in Table 5.5.

The organization of this chapter is as follows. Estimation of the Ravallion LPL and UPL is explained in Section 5.2. The empirical findings on the bias of the Ravallion poverty lines are set out in Section 5.3. Section 5.4 examines the urban and rural cost of living (U-R COL) gap implied by the these poverty lines in comparison with the gap based on the UCPL reported in Chapter 4. The last section summarizes and concludes. At least for Indonesia in 2002, the findings show that the differences between the UCPL and the Ravallion UPL are in the direction implied by theory but are not very large.

5.2. Ravallion lower and upper poverty lines for 2002

The Ravallion method was analyzed in detail in Section 3.4.2 of Chapter 3. To describe the estimation process, the key equations in the Ravallion method are repeated briefly.

The LPL and UPL estimations begin with estimation of the food poverty line for a region (j) in the ten surveyed provinces - $FPL(j)$, which uses equation 3.10 of Chapter 3. The FPL is the expenditure to get 2100 calories per person per day based on the nationally fixed food basket. The estimated FPL is based on the author's food basket (Table 5.1) and the author's prices (reported in Appendix 4.9 of Chapter 4). This means the FPLs for the two Ravallion methods (LPL and UPL) and the food component of the author's UCPL are all identical. The difference between the three methods is only in the non-food components.

Table 5.1: Estimating the quantity of the food basket needed to get 2100 calories per capita per day [a)]

	Items [b)]	Unit	Share in total expenditure (%)[b)]	Average prices across 20 region (Rp 000/unit)	Quantity of food /month obtained by person who spends Rp 100,000/ month in total & Rp 71,150 on food [c)]	Calories per unit [d)]	Calories obtained/ month by person in column (6)	Quantity to get 63,000 calories / month [e)]	Calories obtained at FPL/ month [f)]
(1)	(2)	(3)	(4)	(5)	(6)= (4)/(5)	(7)	(8)=(6)* (7)	(9)=(63,000/ 48,647)*(6)	(10)=(7)*(9)
	Cereal		***24.04***						
1	Local rice	Kg	24.04	2.7	8.91	3,570	31,821	11.5	41,209
	Tuber		***1.14***						
2	Cassava	Kg	1.14	0.6	1.79	1,309	2,338	2.3	3,028
	Fish		***6.14***						
3	Tuna	Kg	2.50	8.5	0.29	824	242	0.4	313
4	Indian mackerel	Kg	1.64	8.5	0.19	904	174	0.2	225
5	Preserved Teri	Ounce	2.00	2.0	1.00	231	229	1.3	297
	Meat		***1.27***						
6	Commercially-bred chicken	Kg	1.27	12.1	0.10	3,020	316	0.1	409
	Egg and milk		***2.29***						
7	Egg of commercially-bred chicken	Kg	1.53	7.6	0.20	1,371	275	0.3	356
8	Egg of native-chicken	Piece	0.49	0.9	0.56	69	39	0.7	50
9	Sweetened condensed milk	Can	0.27	5.0	0.05	1,334	72	0.1	93
	Vegetables		***6.85***						
10	Spinach	Kg	0.67	1.6	0.41	114	47	0.5	60
11	Snake bean	Kg	0.90	3.7	0.25	276	68	0.3	88
12	Cassava leaves	Kg	0.77	1.1	0.69	635	439	0.9	568
13	Shallot	Ounce	1.50	0.6	2.37	35	83	3.1	108
14	Garlic	Ounce	0.78	0.5	1.54	84	129	2.0	167
15	Red Chili	Ounce	1.08	0.8	1.39	26	37	1.8	48
16	Small Chili	Ounce	1.15	0.9	1.34	88	117	1.7	152
	Pulses		***2.75***						
17	Tofu	Kg	1.16	2.2	0.53	800	424	0.7	549
18	Fermented soy bean	Kg	1.59	2.6	0.61	1,430	877	0.8	1,136
	Fruits		***2.31***						
19	Papaya	Kg	2.31	1.1	2.09	345	722	2.7	935
	Oil and Fats		***3.53***						
20	Cooking oil	Liter	2.18	3.6	0.61	6,960	4,217	0.8	5,461
21	Coconut	Piece	1.35	1.2	1.14	1,336	1,524	1.5	1,973

Continued...

	Beverage		***4.21***						
22	Granulated sugar	Ounce	3.09	0.5	6.46	364	2,353	8.4	3,047
23	Powdered coffee	Ounce	1.12	2.5	0.44	352	156	0.6	202
	Spices		***2.09***						
24	Salt	Ounce	1.08	0.1	8.30	0	0	10.7	0
25	Pepper	Ounce	0.51	3.4	0.15	359	54	0.2	69
26	Tamarind	Ounce	0.50	0.5	0.93	132	123	1.2	159
	Other consumption		***1.14***						
27	Instant noodle	Pack	1.14	0.8	1.37	356	488	1.8	632
	Prepared food and drink		***6.27***						
28	Fried rice	Plate	0.40	2.9	0.14	584	80	0.2	104
29	Meat balls/pang sit noodle	Bowl	5.87	2.6	2.28	529	1,205	3.0	1,561
	Tobacco and betel		***7.13***						
30	Filtered clove cigarette	Bar	3.77	0.4	9.72	0	0	12.6	0
31	Unfiltered clove cigarette	Bar	3.36	0.3	11.16	0	0	14.4	0
	Total		***71.15***				***48,647***		***63,000***

Notes:

a) This table is for a hypothetical region with prices equal to the average prices across all regions. The actual food poverty lines were calculated separately for each region using actual prices (author's prices reported in Appendix 4.9 of Chapter 4) for that region.

b) The items and the shares are as reported in Table 4.4 of Chapter 4.

c) Rp 71,150 is calculated from total food share of 71.15 per cent times Rp 100,000. The idea is how many units of food item *i* an household will receive if the household is given Rp 100,000 and then spent it on each item *i* according to the share indicated in column 4. That is, 24.04 per cent of Rp 100,000 must be spent on rice, 1.14 per cent of Rp 100,000 must be spent on cassava, and so forth. The end result of how much the quantity of item *i* enables the households to reach the requirement energy per month (i.e., 63,000 calories per capita per month or equivalent to 2,100 calories per capita per day) is shown in column 9.

d) Derived from Susenas 1996.

e) Scale-up factor adjustment is defined as the calories requirement per month (i.e., 63,000 calories per capita per month) divided by total calories obtained from spending Rp 71,150 on foods (i.e., 48,647 calories, see the total in column 8).

f) This column is just to check that the total calories obtained from the estimated quantity of each item *i* is 63,000 calories per month.

Source: Susenas 1996 and 2002 (Author's estimates)

Having a FPL for each region, the next step is to estimate the food share using a regression of an Engel equation:

5.1 $$\alpha(h) = \beta + \gamma_1 \ln\left(\frac{y(h)}{FPL(h)}\right) + \gamma_2\left[\ln\left(\frac{y(h)}{FPL(h)}\right)\right]^2 + \phi DUR(h) + \sum_{v=1}^{9}\delta_v DPROV^v(h) + x(h)\pi + \varepsilon(h)$$

for household h = 1, ..., 37,390 living in the ten surveyed provinces.

where $\alpha(h)$ is the share of expenditure of the household spent on the food basket; $y(h)$ is the nominal per capita expenditure of household h; $FPL(h)$ is the food poverty line for the region where household h lives and has 20 different values (which means all households living in the same region have the same value for $FPL(h)$). In some regressions γ_2 was set to zero. $DUR(h)$ and $DPROV^v(h)$ are the regional dummy variables. $DUR(h)$ is the dummy variable for urban and rural areas ($DUR(h)$ = 0 if the household lives in a rural area, otherwise $DUR(h)$ =1). $DPROV^1, \ldots, DPROV^9$ are the dummy variables for each province relative to province 10 (North Sumatra), which is the reference province. $DPROV^v(h)$ = 1 if household h lives in province v and $DPROV^v(h)$ = 0 otherwise. $x(h)$ is a set of demographic variables (household characteristics). The demographic variables are the number of workers within a household; the number of household members under several age categories; education level, marital status, and gender of household head; $\varepsilon(h)$ is the error term; and β, γ_1, γ_2, ϕ, δ and π are the parameters to be estimated.

The LPL for region j:

5.2 $$z_L(j) = FPL(j)[(2 - \hat{\alpha}(j)]$$

where $\hat{\alpha}(j)$ is the predicted regional food share of a person with average characteristics in region j whose total expenditure is equal to the FPL in that region: $y(h) = FPL(h)$. For a person with this expenditure, $\ln\left(\frac{y(h)}{FPL(h)}\right) = 0$. Therefore, $\hat{\alpha}(j) = \hat{\beta} + \bar{x}_{(30)}(j)\hat{\pi} + \hat{\phi} + \hat{\delta}_j$ if j is an urban area and $\hat{\alpha}(j) = \hat{\beta} + \bar{x}_{(30)}(j)\hat{\pi} + \hat{\delta}_j$ if j is a rural area; $\hat{\beta}$, $\hat{\pi}$, $\hat{\phi}$ and $\hat{\delta}_j$ are the estimated regression coefficients; and $\bar{x}_{(30)}(j)$ is the average of demographic variables of the lowest 30 per cent nominal per capita expenditure within region j rather than the average across all regions as in Bidani and Ravallion (1993, p. 68). The demographic variables captured in the estimated food-share for a region - $\hat{\alpha}(j)$ - are therefore specific to that region.[1]

The UPL for region j:

5.3 $$z_U(j) = \frac{FPL(j)}{\hat{\alpha}^*(j)}$$

---

[1] However, the author also did a calculation using the average values for all regions, $\bar{x}_{(30)}$. This procedure implies the only causes for the differences in food-shares across regions are the provincial and urban/rural dummy variables. The key results of using these food shares are detailed in Appendix 5.2. However, in short, these food-shares result in even a stronger bias in the Ravallion UPL and in little different bias in the Ravallion LPL compared to the biases obtained when the mean of each demographic variable in a specific region - $\bar{x}_{(30)}(j)$ is used to estimate the food-shares.

where $\hat{\alpha}^*(j)$ is the predicted regional food share of a household that consumes 2100 calories per capita per day. For this household, $y(h) = z_U(j)$ and expenditure on food is $FPL(j)$. Therefore, $\frac{y(h)}{FPL(h)} = \frac{1}{\hat{\alpha}^*(j)}$. Substituting this into equation 5.1 gives:

$$5.4 \qquad \hat{\alpha}^*(j) = \hat{\beta} + \hat{\gamma}_1 \ln(\frac{1}{\hat{\alpha}^*(j)}) + \hat{\gamma}_2 \left(\ln(\frac{1}{\hat{\alpha}^*(j)}) \right)^2 + \bar{x}_{(30)}(j)\hat{\pi} + \hat{\phi} + \hat{\delta}_j, \text{ if } j \text{ is urban}$$

$$= \hat{\beta} + \hat{\gamma}_1 \ln(\frac{1}{\hat{\alpha}^*(j)}) + \hat{\gamma}_2 \left(\ln(\frac{1}{\hat{\alpha}^*(j)}) \right)^2 + \bar{x}_{(30)}(j)\hat{\pi} + \hat{\delta}_j, \text{ if } j \text{ is rural;}$$

Therefore,

$$(5.4') \quad \hat{\alpha}^*(j) = \hat{\alpha}(j) + \hat{\gamma}_1 \ln(\frac{1}{\hat{\alpha}^*(j)}) + \hat{\gamma}_2 \left(\ln(\frac{1}{\hat{\alpha}^*(j)}) \right)^2$$

The value for $\hat{\alpha}^*(j)$ that solves this equation is found by iteration. The starting value for the iteration was $\hat{\alpha}(j)$ from equation 5.2. Once the convergence is obtained, $\hat{\alpha}^*(j)$ is known. Since $FPL(j)$ is also known, the UPL - $z_U(j)$ - can be found from equation 5.3. The expected value for $\hat{\alpha}^*(j)$ is less than $\hat{\alpha}(j)$, since the expenditure level, at which the $\hat{\alpha}^*(j)$ is estimated, is higher than the expenditure level, at which the $\hat{\alpha}(j)$ is estimated.

All the estimated results including the FPL, $\hat{\alpha}(j)$, the LPL, $\hat{\alpha}^*(j)$ and the UPL for each region are reported in Table 5.2. In addition, regression results and the summary statistics of the demographic variables, food share, and ratio of per capita expenditure to

FPL are reported in Appendix 5.1.

Some highlighted points from Table 5.2 are as follows. Firstly, the food price index (P^F) implied by the estimated FPL is exactly the same as P^F reported in Table 4.7 of Chapter 4. This must be the case since the share of each item in the food bundle and the prices used to estimate the FPL are the ones used in Table 4.7.

Secondly, the average regional food shares to estimate LPL across urban areas is 0.678 and across rural 0.719. These two food shares are very close to the average of the food share of households with expenditure around the FPL living in urban and rural areas, respectively, as shown in Table A5.2 (Appendix 5.1). Thus, the parameters estimated in the regression are able to predict very well the average food shares in both urban and rural areas. In addition, the new regional food-shares to estimate UPL $(\hat{\alpha}^*)$ for every region as expected is lower than the food share to estimate LPL $(\hat{\alpha})$.

Lastly, a relatively high LPL is associated with a relatively high UPL for both urban and rural areas (Figure 5.1). Spearman rank correlation between UPL and LPL is very high (0.97) and significant at the 1% level (n=20). This indicates the bias of the two types of Ravallion poverty lines is similar. That is, if the bias of the Ravallion LPL is proved, then the bias of the Ravallion UPL is also likely to be proven, and vice versa.

Table 5.2: The FPL, food shares and poverty lines for 2002 based on the Ravallion method (Rp 000/ capita/ month) [a)]

Province	FPL (Rp000/ month)	Food share at FPL	LPL (Rp000/ month)	NFPL-L (Rp000/ month)	Food share at UPL	UPL (Rp000/ month)	NFPL-U (Rp000/ month)
URBAN [b)]							
C Java	91.7	0.663	122.6	30.9	0.643	142.8	51.0
W Nusa T	92.7	0.729	117.8	25.1	0.715	129.6	36.9
Lampung	93.9	0.685	123.4	29.6	0.667	140.8	46.9
E Java	94.4	0.668	125.8	31.4	0.647	145.8	51.4
S Sulawesi	97.3	0.689	127.5	30.2	0.672	144.8	47.5
N Sumatra	97.6	0.727	124.2	26.7	0.713	136.9	39.4
N Sulawesi	97.8	0.688	128.3	30.5	0.671	145.8	48.0
S Kalimantan	98.2	0.736	124.1	25.9	0.723	135.8	37.6
S Sumatra	99.3	0.698	129.2	29.9	0.682	145.6	46.4
W Java	101.1	0.673	134.2	33.1	0.653	154.8	53.7
Wtg.Avg. 10 Prov. [C)]	96.8	0.678	128.0	31.1	0.659	147.0	50.2
RURAL [b)]							
S Kalimantan	80.6	0.782	98.1	17.6	0.772	104.3	23.7
E Java	83.6	0.705	108.2	24.7	0.689	121.3	37.7
C Java	84.2	0.700	109.4	25.2	0.684	123.1	38.9
Lampung	85.2	0.725	108.6	23.4	0.711	119.8	34.6
W Nusa T	86.0	0.765	106.3	20.2	0.754	114.1	28.1
W Java	89.2	0.710	115.0	25.8	0.695	128.4	39.2
S Sumatra	91.0	0.740	114.6	23.7	0.727	125.2	34.2
S Sulawesi	91.2	0.730	115.8	24.7	0.716	127.4	36.2
N Sulawesi	92.5	0.723	118.1	25.7	0.708	130.6	38.1
N Sumatra	95.6	0.766	118.0	22.4	0.755	126.7	31.1
Wtg.Avg. 10 prov. [C)]	87.2	0.719	111.7	24.5	0.704	123.9	36.8

Notes:

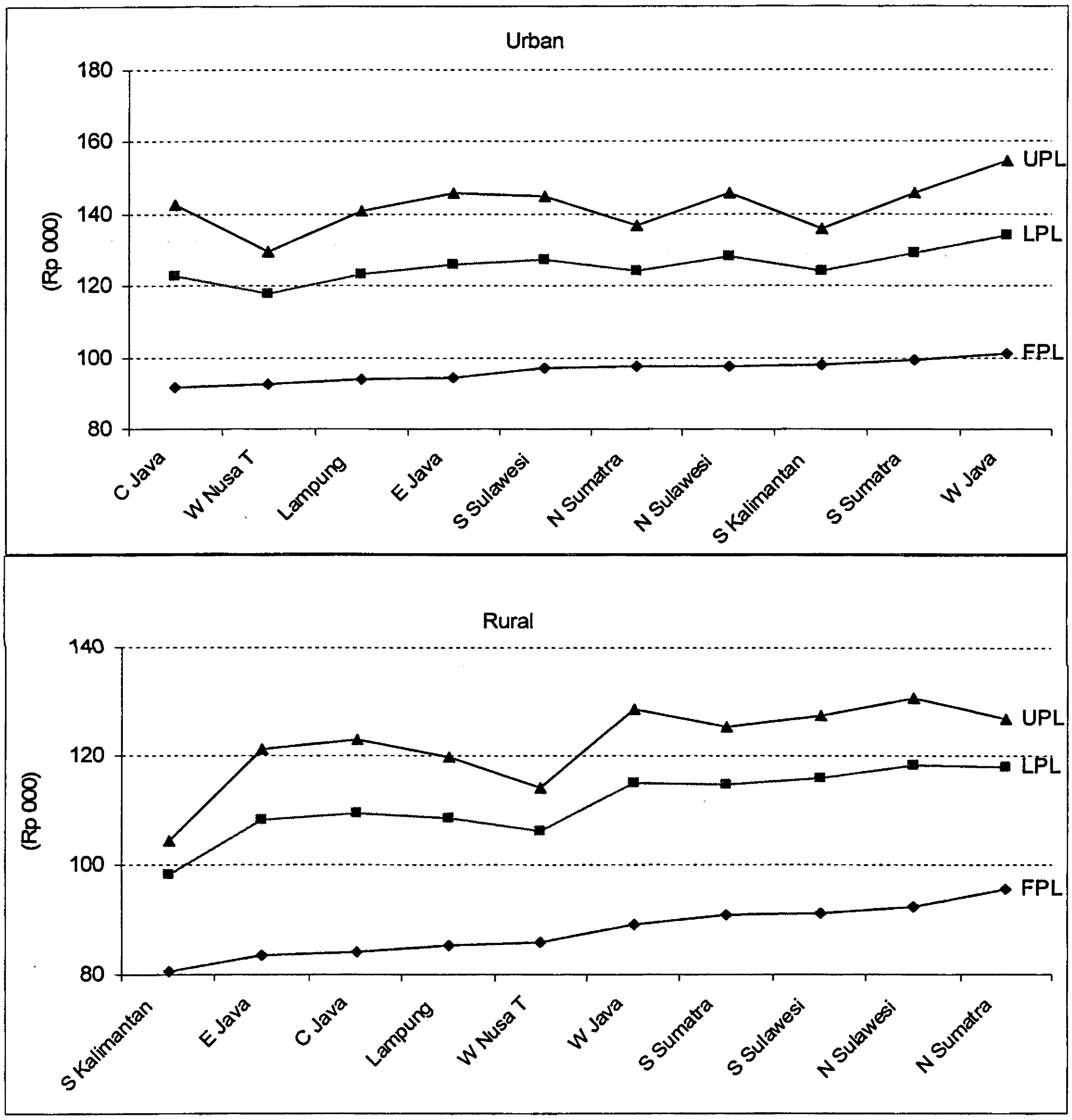
a) FPL is the food poverty line; LPL and UPL are lower and upper poverty lines, respectively. 'Food share at FPL' is as defined in equation 5.2 to estimate LPL. 'Food share at UPL' is as defined in equation 5.4' to estimate UPL. NFPL-L is non-food poverty lines derived from LPL minus FPL and NFPL-U is derived from UPL minus FPL. NFPL

b) Provinces are listed in ascending order by FPL within each area.

c) Population weighted average.

Source: Author's calculation

Figure 5.1: The FPL, LPL, and UPL for 2002 based on the Ravallion method (Rp 000 per capita per month)



Notes: FPL, LPL, and UPL is the food poverty line, lower and upper poverty lines, respectively. The graphs in each area are ranked by an ascending order of FPL within each area.

Source: Table 5.2

5.3. Bias of the Ravallion poverty lines

This section provides a proof of the bias of the Ravallion poverty lines in practice.

As pointed out in Chapter 3, the source of bias may come from the regression method for estimating poverty lines. The indirect estimation of the non-food poverty line through the regression is not the solution to the problem of inconsistent poverty lines. As insisted by Kakwani (2001, p.14; 2003, p.17), consistent poverty lines must be obtained by constructing a cost of living index across regions comprising food and non-food items.

The second source of the bias is from anchoring the total poverty line to a minimum calories requirement for each region. This means that whatever happens with the relative price of food to non-food, the household on the Ravallion UPL must consume 2100 calories per capita per day. When the relative food price to non-food price is relatively high, the household should have a substitution away from food to non-food if the utility level is constant. But, the household on Ravallion UPL, by construction, must still consume the 2100 calories. Therefore, the expenditure of this household must be higher than one in a region where food is cheaper. As explained in Section 3.4.2 of Chapter 3, for this reason the Ravallion UPL for regions with relatively high food prices is biased upwards relative to those with relatively low food prices.

The following is the approach to measure bias of the Ravallion poverty lines. Let P_j, P_j^F, and P_j^N be the author's SCOLI price index, food price index, and non-food price index, respectively. Each of the indices is for region j relative to average rural of the ten provinces = 100. Let P_j^{UPL} and P_j^{LPL} be the corresponding indices implied by the Ravallion UPL and LPL, respectively. The bias of the Ravallion UPL and LPL are respectively defined as:

5.5 $$b_j^{UPL} = \left(\frac{P_j^{UPL} - P_j}{P_j} \right) 100 \text{ for } j = 1, 2, \ldots, 20; \text{ and}$$

5.6 $$b_j^{LPL} = \left(\frac{P_j^{LPL} - P_j}{P_j} \right) 100 \text{ for } j = 1, 2, \ldots, 20.$$

Thus, each bias is defined as the percentage deviation of price index implied by the Ravallion poverty lines from the author's SCOLI price index. It takes a value of zero whenever the price index implied by a Ravallion poverty line is equal to the author's SCOLI price index.

The relative price of food to non-food is defined as a ratio of the author's P^F to the author's P^N:

5.7 $$p_j = \left(\frac{P_j^F}{P_j^N} \right) 100 \text{ for } j = 1, 2, \ldots, 20.$$

The relative price takes the value of 100 if the food price index and non-food price index are identical.

Table 5.3 reports the author's SCOLI and food price index as reported in Tables 4.5 and 4.7 of Chapter 4, respectively. The author's non-food price index is estimated using equation 3.14 of Chapter 3, but applied for non-food items only. This table also reports the price indices implied by the Ravallion non-food poverty lines, LPL, and UPL (see notes for Table 5.3). Having these variables, the bias of LPL and UPL as well as the relative price of food to non-food defined in the equations above are estimated and reported in Table 5.4.

The higher food price relative to the non-food price is associated with the higher bias of the Ravallion method, for both LPL and UPL. This can be seen from Table 5.4 and the scatter diagram in Figure 5.2. A regression line added to the scatter diagram shows the positive relationship between the two variables.

The regression of the bias of the Ravallion LPL and UPL to the relative price shows:

$$\boldsymbol{b}^{LPL} = -\,24.52 + 0.25\,\boldsymbol{p}$$
$$(-4.35)^{*} \quad (4.35)^{*} \qquad R^2 = 0.51 \quad N=20$$

$$\boldsymbol{b}^{UPL} = -\,18.72 + 0.19\,\boldsymbol{p}$$
$$(-1.68) \quad (1.71) \qquad R^2 = 0.14 \quad N=20$$

where $\boldsymbol{b}^{LPL}$ and $\boldsymbol{b}^{UPL}$ are the bias of Ravallion LPL and UPL, respectively; $\boldsymbol{p}$ is the relative food price index to non-food price index; the figures in the brackets are t-statistics; * indicates significant at the 1% level.

Table 5.3: The price of food, non-food, and price indices implied by poverty lines based on Ravallion LPL and UPL methods

Province	UCPL approach a)			Ravallion methods b)			
	P^F	P^N	P	P^N	P^{LPL}	P^N	P^{UPL}
Urban c)							
C Java	105.2	97.1	102.9	126.2	109.8	138.9	115.2
W Nusa T	106.3	106.7	106.4	102.5	105.5	100.4	104.6
Lampung	107.7	106.7	107.4	120.8	110.5	127.7	113.6
E Java	108.3	125.0	113.0	128.1	112.6	139.8	117.6
S Sulawesi	111.6	105.2	109.7	123.3	114.1	129.3	116.8
N Sumatra	111.9	110.2	111.4	108.9	111.3	107.1	110.5
N Sulawesi	112.2	143.3	121.0	124.4	114.9	130.7	117.7
S Kalimantan	112.6	107.1	111.1	105.8	111.1	102.4	109.6
S Sumatra	113.9	106.1	111.7	122.2	115.7	126.1	117.5
W Java	116.0	127.9	119.4	135.1	120.2	146.1	124.9
Wtg.Avg. 10 prov.	111.1	117.0	112.8	127.2	114.6	136.5	118.6
Rural c)							
S Kalimantan	92.5	99.2	94.4	71.7	87.9	64.6	84.2
E Java	95.9	92.5	94.9	100.7	96.9	102.7	97.9
C Java	96.5	103.2	98.4	103.0	97.9	105.9	99.3
Lampung	97.7	94.6	96.8	95.6	97.3	94.2	96.7
W Nusa T	98.7	103.7	100.1	82.7	95.2	76.5	92.1
W Java	102.3	106.7	103.6	105.5	103.0	106.6	103.6
S Sumatra	104.4	104.9	104.5	96.6	102.7	93.0	101.0
S Sulawesi	104.6	88.7	100.1	100.7	103.7	98,5	102.8
N Sulawesi	106.1	132.5	113.6	104.7	105.8	103.7	105.4
N Sumatra	109.7	92.5	104.8	91.5	105.7	84.6	102.2
Wtg.Avg. 10 prov.	100.0	100.0	100.0	100.0	100.0	100.0	100.0
U-R COLI Gap	11.1	17.0	12.8	27.2	14.6	36.5	18.6

Notes:

a) P and P^F is the author's SCOLI and food price index as reported in Tables 4.5 and 4.7 of Chapter 4, respectively. P^N the author's non-food price index estimated using equation 3.14 of Chapter 3 (i.e., for estimating SCOLI), but applied for non-food items only:

$$P^N(j,2002) = \gamma\left(\sum_{i=32}^{49} s(i,2002)\frac{p(i,j,2002)}{\overline{p}(i,2002)}\right), \text{ for } j = 1, 2, \ldots, 20$$

where γ is a constant chosen to make the population weighted average of the term in the bracket of the right hand side equation for rural areas in the ten surveyed provinces equal to 100.

b) Each of the indices under the Ravallion method is the price index implied by its associated line reported in Table 5.2 (e.g., the food price index is implied by FPL). The index is calculated using formula analogues to equation 4.2 of Chapter 4, which is rewritten:

$$\widetilde{P}'(j,2002) = \phi[z'(j,2002)], \text{ for } j = 1, 2, \ldots, 20$$

where ϕ is a constant chosen to make the population weighted average of $\widetilde{z}'(j,2002)$ for rural areas in the ten surveyed provinces equal to 100. $\widetilde{z}'$ denotes the associated line reported in Table 5.2.

c) In ascending order by FPL within each area.

d) Population weighted average.

Source: Author's estimates

Table 5.4: The relative price of food to non-food and bias in the Ravallion poverty line

Province [a)]	Urban/Rural	Relative price of food to non-food [b)]	Bias of LPL (%) [c)]	Bias of UPL (%) [c)]
N Sumatra	Rural	118.6 *	0.9**	-2.4
S Sulawesi	Rural	117.9	3.7	2.7
C Java	Urban	108.4	6.7	11.9
S Sumatra	Urban	107.3	3.6	5.2
S Sulawesi	Urban	106.1	4.0	6.4
S Kalimantan	Urban	105.2	0.1	-1.3
E Java	Rural	103.7	2.1	3.2
Lampung	Rural	103.4	0.4	-0.2
N Sumatra	Urban	101.6	-0.1	-0.8
Lampung	Urban	100.9	2.9	5.8
W Nusa T	Urban	99.6	-0.9	-1.8
S Sumatra	Rural	99.5	-1.8	-3.4
W Java	Rural	95.9	-0.5	0.0
W Nusa T	Rural	95.1	-4.9	-8.0
C Java	Rural	93.6	-0.5	0.9
S Kalimantan	Rural	93.2	-6.9	-10.8
W Java	Urban	90.7	0.7	4.6
E Java	Urban	86.6	-0.4	4.1
N Sulawesi	Rural	80.0	-6.9	-7.2
N Sulawesi	Urban	78.3	-5.1	-2.8

Notes:

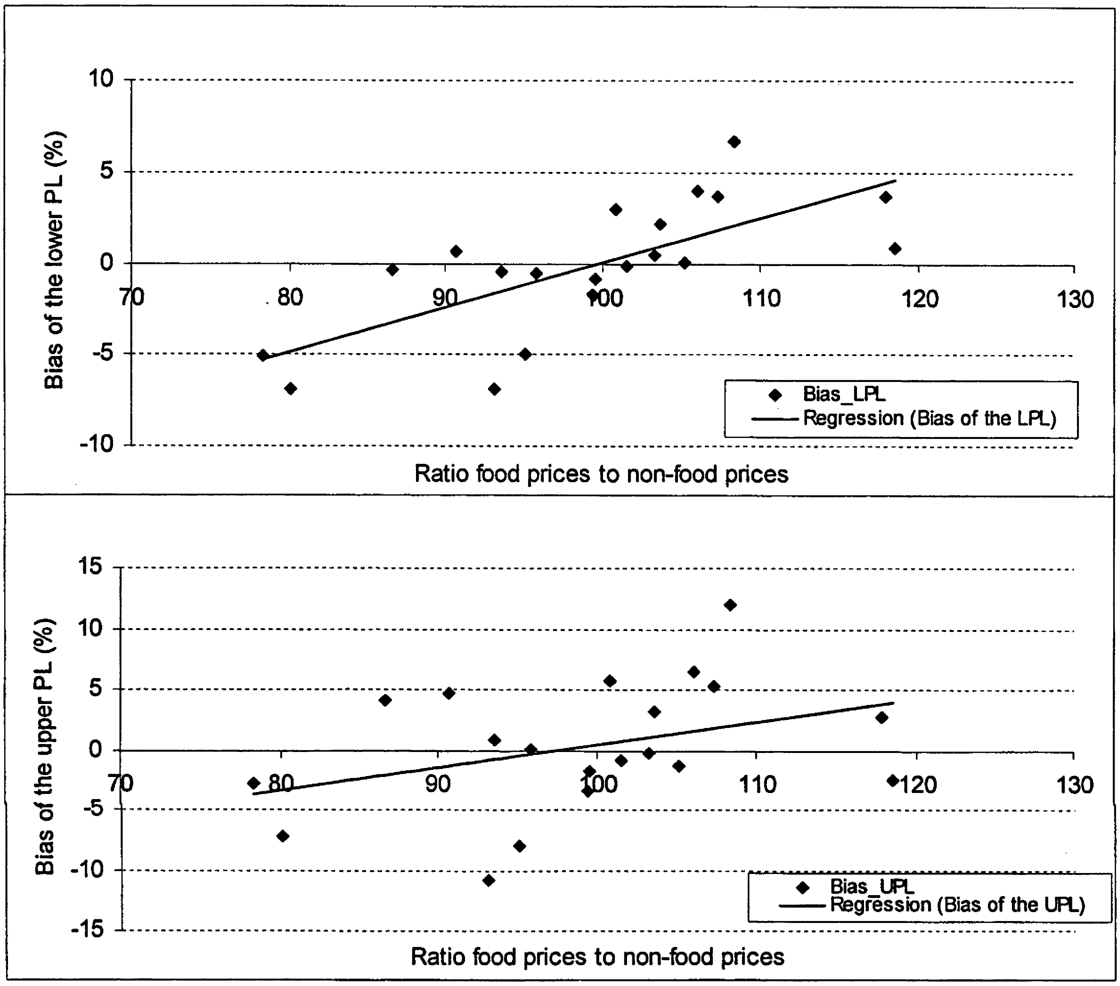
a) Twenty regions in total (10 provinces by urban and rural areas) sorted in descending order of relative prices.

b) As defined in equation 5.7. The relative price in rural N Sumatra (with symbol *), for example, 118.6 is calculated from (105.9/92.5)*100 taken from Table 5.3.

c) The bias of LPL and UPL is defined in equations 5.5 and 5.6, respectively. The bias in rural N Sumatra (with symbol **), for example, is 0.9 (=((105.7-104.8)/104.8)*100) taken from Table 5.3.

Source: Recalculated from Table 5.3

Figure 5.2: Scatter diagram of the relative prices with the bias from the Ravallion LPL and UPL



Source: Table 5.4

The regression results also show that 51 per cent of the variations in the bias of LPL can be explained by the variations in the relative price of food to non-food. In addition, the bias of the UPL is also positively correlated with the relative price of food to non-food. However, the coefficient is only significant at the 11% level.

The coefficient of the bias of the LPL (i.e., 0.25) indicates every 1 percent increase in the relative price of food in a region in 2002 (e.g., from 100 to 101) would increase the bias of the UPL by 0.25 percentage points (e.g., from 0 percent to .25 percent). As the average rural Ravallion LPL (reported in Table 5.2) was Rp 111,667 per capita per month, the coefficient of 0.25 implies an upward bias in the Ravallion LPL of only Rp 280 per month per 1 per cent deviation in the relative price of food. Likewise, as the average rural Ravallion UPL (reported in Table 5.2) was Rp 123,934 per capita per month, the coefficient of the bias of the UPL (i.e., 0.19) corresponds to an upward bias of the Ravallion UPL of only Rp 240 per month per 1 per cent deviation in the relative price of food.

However, as can be seen from Table 5.4, the biases in the Ravallion LPL and UPL for some regions were more than absolute 5 per cent in absolute value, which probably leads to significant values in terms of absolute Rupiah deviations of the Ravallion LPL and UPL from the UCPL. In addition, the distribution of household expenditure is heavily skewed toward low expenditure groups, which means poverty incidence will be very sensitive to the levels of poverty line. Therefore the biases in the Ravallion LPL and UPL mentioned above could result in a rather significant deviation in poverty incidence estimated from the Ravallion LPL and UPL methods relative to the corresponding estimates from the UCPL approaches. This issue is addressed in Table 5.5.

Table 5.5: Poverty incidence in 2002 derived from the Ravallion LPL and UPL methods compared to the corresponding estimates from the UCPL(L) and UCPL(U) approaches (%)

Province [a]	Area	Poverty incidence (%)			Poverty incidence (%)		
		LPL [b]	UCPL(L) [c]	Difference [d]	UPL [e]	UCPL(U) [f]	Difference [g]
Regions in which the relative prices of food to non-food exceeds 100:							
N Sumatra	Rural	35.5	34.8	0.8	41.9	44.0	-2.1
S Sulawesi	Rural	48.1	44.3	3.8	59.1	56.5	2.5
C Java	Urban	21.2	16.7	4.5	34.0	23.7	10.3
S Sumatra	Urban	16.6	14.5	2.1	23.7	20.7	3.0
S Sulawesi	Urban	11.3	8.5	2.8	22.4	16.8	5.6
S Kalimantan	Urban	4.0	4.0	0.0	8.2	8.8	-0.6
E Java	Rural	35.0	32.8	2.3	46.8	43.5	3.2
Lampung	Rural	40.3	40.1	0.3	51.1	51.1	0.0
N Sumatra	Urban	11.4	11.4	0.0	16.4	17.3	-1.0
Lampung	Urban	22.0	19.7	2.3	34.4	29.1	5.3
Simple average for above regions		24.5	22.7	1.9	33.8	31.2	2.6
Regions in which the relative prices of food to non-food less than 100:							
W Nusa T	Urban	35.2	36.0	-0.8	42.0	43.9	-1.9
S Sumatra	Rural	38.1	40.5	-2.4	47.8	50.8	-3.0
W Java	Rural	27.7	28.3	-0.6	39.0	39.0	0.0
W Nusa T	Rural	38.7	44.1	-5.3	46.3	55.7	-9.4
C Java	Rural	35.9	36.4	-0.5	48.8	47.7	1.1
S Kalimantan	Rural	18.2	22.0	-3.8	21.7	29.0	-7.2
W Java	Urban	14.8	14.5	0.3	22.9	20.4	2.5
E Java	Urban	20.5	20.7	-0.2	31.0	28.3	2.7
N Sulawesi	Rural	40.2	46.8	-6.6	50.4	57.1	-6.7
N Sulawesi	Urban	17.3	20.1	-2.9	25.9	27.6	-1.7
Simple average for above regions		28.7	30.9	-2.3	37.6	39.9	-2.3

Notes:

a) Twenty regions in total (10 provinces by urban and rural areas) sorted in descending order of relative prices as in Table 5.4. The regions in the top part are those with relative prices higher than 100 and the regions in the bottom part are those with relative prices lower than 100 (see Table 5.4).

b) Poverty incidence estimated using the Ravallion *lower* poverty lines as reported in Table 5.2.

c) The poverty incidence estimated from the UCPL(L) approach corresponding to the Ravallion *lower* poverty lines (point 'b'). That is, the average SCOLI across rural ten provinces (i.e., 100 shown in Table 5.3) is set to correspond to the average Ravallion LPL across rural ten provinces in point 'b' (i.e., Rp 111,667 per capita per month as shown in Table 5.2). The poverty lines for other regions are set according to their SCOLI. For example, as the SCOLI for urban N Sumatra for 2002 was 111.4, the poverty line for N Sumatra was Rp 124,425 per capita per month.

d) In percentage points. The average across regions in the top part was 2 percentage points and average across the bottom part was -2 percentage points.

e) Poverty incidence estimated using the Ravallion *upper* poverty lines as reported in Table 5.2.

f) The poverty incidence estimated from the UCPL(U) approach corresponding to the Ravallion *upper* poverty lines (point 'e'). The poverty lines for all regions are estimated in the same way as in point 'c', but using average Ravallion UPL across rural ten provinces in point 'e', Rp 123,934 per capita per month. Therefore, for example, the poverty line for N Sumatra was Rp 138,093 per capita per month.

g) In percentage points. The average across regions in the top part was 3 percentage points and average across the bottom part was -2 percentage points.

Source: Author's estimates

To compare estimated poverty incidence under the Ravallion and UCPL methods, it is necessary to make the poverty lines comparable on average. Since the Ravallion UPL is obviously significantly higher on average than the Ravallion LPL, it is necessary to use two sets of UCPLs: one set that is comparable on average to the Ravallion UPL and another that is comparable on average to the Ravallion LPL. The two sets of UCPLs used to generate the results in Table 5.5 are referred to as UCPL(U), which is comparable to the Ravallion UPL and UCPL(L), which is comparable to the Ravallion LPL. The details of exactly how UCPL(U) and UCPL(L) were constructed are given in footnotes 'c' and 'f' to Table 5.5.

Poverty incidence for 2002 estimated using the Ravallion LPL for regions with the price of food relative to non-food higher than 100 were on average biased upwards, as predicted. Average poverty incidence in these regions was higher by 2 percentage points compared to the UCPL(L). For these same regions, the bias in poverty incidence estimated using the Ravallion UPL, compared to the UCPL(U) was on average even larger at 3 percentage points. Correspondingly, in regions in which the relative price of food was less than 100, poverty incidence estimated using the Ravallion LPL was 2 percentage points lower than that given by the UCPL(L). In the same regions, poverty incidence using the Ravallion UPL was also 2 percentage points lower than that implied by the UCPL(U).

5.4. U-R COL gaps based on the UCPL and Ravallion for 2002

As discussed in Chapter 4, the author's urban-rural cost of living gap (U-R COL gap) for 2002 (UCPL approach), was close to the gap estimated by other researchers who applied the Ravallion method for different years, such as Pradhan et al. (2000) for 1996 and 1999, Bidani and Ravallion (1993) estimates for 1990. The U-R COL gap estimated by the author for 2002 was 13 per cent and those of other researchers ranged from 10 per cent to 15 per cent. Having the SCOLI implied by the Ravallion method for 2002 for each region (reported in Table 5.3), the aim of this section is to answer whether the similarity between the results of these studies are robust.

During 12-years between 1990 and 2002, the consumption patterns of the poor within urban or rural areas might have changed and prices for urban might have risen faster (lower) than rural areas. These factors might have changed the U-R COL gap over time.

However, as can be seen from Table 5.3, the U-R COL gap for 2002 implied by the

Ravallion LPL (estimated by the author) was 15 per cent and the gap based on the UCPL was 13 per cent. This means the two approaches give a similar U-R COL gap for 2002. Therefore, the similarity of the U-R COL gaps estimated by the UCPL for 2002 with the gap estimated by other researchers using the Ravallion method reported in Chapter 4 is not just coincidence. This means all these studies imply the U-R COL gap in Indonesia has not been as large as the gap implied by the official poverty lines. Likewise, the U-R COL gap for 2002 implied by the Ravallion UPL as reported in the last column of Table 5.3 was quite similar compared to the others, although it is a bit higher at 18.6 per cent.

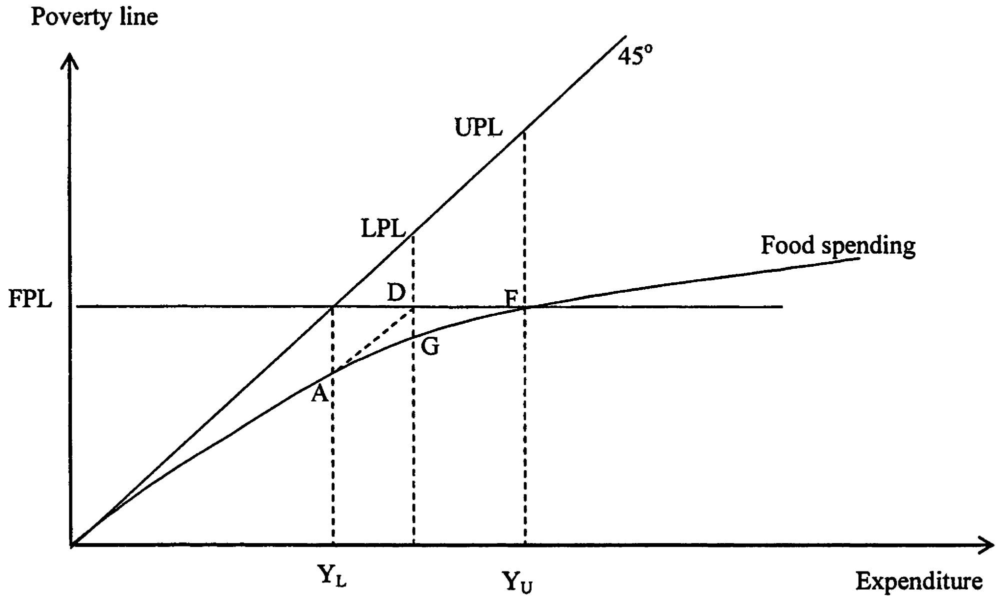
5.4.1. Household food shares

This section shows empirically the food share implied by the Ravallion LPL (i.e., ratio of FPL to LPL, as indicated by point D of Figure 5.3 is higher than households' food shares with the expenditure level on the lower and upper poverty line as indicated by points G and F respectively at the food spending curve. It is even higher than households' food shares with the expenditure level on the food poverty line, point A.

Firstly, it will be shown theoretically that the food share at point D (FPL/LPL) is higher than the food share at point A. Let equation 5.2 (with omitting regional variables *j*) be rearranged as:

5.2' $$\frac{FPL}{z_L}=\frac{1}{2-\hat{\alpha}}$$

Figure 5.3: The lower poverty line and upper poverty line of the Ravallion methods



Notes: This figure is the replication of Figure 3.4 of Chapter 3 with some adjustments to clarify the points made in this chapter.

The left hand side of this equation is the food share implied by the LPL. Subtracting $\hat{\alpha}$, the food share at point A, where total expenditure is only equal to the FPL gives:

$$5.2\text{''} \quad \frac{FPL}{z_L} - \hat{\alpha} = \frac{1}{2-\hat{\alpha}} - \hat{\alpha} = \frac{1-\hat{\alpha}(2-\hat{\alpha})}{2-\hat{\alpha}} = \frac{1+\hat{\alpha}^2-2\hat{\alpha}}{2-\hat{\alpha}} = \frac{(1-\hat{\alpha})^2}{2-\hat{\alpha}} > 0$$

Therefore, $\dfrac{FPL}{z_L} > \hat{\alpha}$.

Secondly, by Engel's law, the food share of households with expenditure level on the

FPL - $\hat{\alpha}$ - is higher than the food share of households with expenditure level on the LPL, which is in turn higher than the food share of households with expenditure level on the UPL, since FPL < LPL < UPL.

The empirical findings confirm these food share orderings and are reported in Table 5.6. The food share implied by the ratio of FPL to LPL for urban areas for 2002, i.e., 0.767, was the highest compared to households' food share living in urban areas with expenditure level on the FPL, LPL, and UPL, which was 0.678, 0.668, and 0.659, respectively. This also holds for rural areas.

Table 5.6: Households' food shares at different levels of expenditure

Food shares:	Point [c)]	Avg. urban	Avg. rural
As measured by Ratio FPL to LPL [a)]	D	0.767	0.791
Households with expenditure equals to FPL [b)]	A	0.678	0.719
Households on the Ravallion LPL [a)]	G	0.668	0.709
Households on the Ravallion UPL [b)]	F	0.659	0.704

Notes:

a) Recalculated from Table 5.2

b) As reported in Table 5.2

c) Refers to Figure 5.3 in this chapter.

Source: As cited in the notes.

5.4.2. Decomposition of U-R COL gaps

This section explains why the UCPL and the Ravallion LPL methods yield a very similar U-R COL gaps (LPL: 14.6 per cent; UCPL: 12.8 per cent) even though the LPL estimate of the urban-rural gap for non-food prices is much higher than the UCPL estimate of this gap (LPL: 27.2 per cent; UCPL: 17.0 per cent) (see, Table 5.3).

The weight assigned to food prices, P^F, by the Ravallion LPL method is much higher than that assigned to P^F by the UCPL method. Correspondingly, the weight on non-food prices, P^N, is lower for the LPL than for the UCPL.

Recall that the SCOLI is simply the weighted average of P^F and P^N. Let the SCOLI, food price index, and non-food price index for average urban areas (with the average rural areas equals unity) be P^{Σ}, P^F, and P^N, then:

5.8 $$P_R^{\Sigma} = \alpha_R P^F + (1-\alpha_R)P_R^N$$

5.8a $$P_A^{\Sigma} = \alpha_A P^F + (1-\alpha_A)P_A^N$$

where α is the weight of P^F and $(1-\alpha)$ is the weight for P^N, the subscripts R and A denote Ravallion and the Author, respectively. Recall that both methods have the same estimates of food prices, P^F, but different estimates of non-food prices, P_R^N and P_A^N. It may seem paradoxical to refer to the non-food price index for the Ravallion methods, since these methods are designed for situations where non-food prices are not observed. However, a non-food poverty line is implied by the excess of either of the Ravallion total poverty lines over the FPL. Variations in this non-food poverty line are the non-food price index implied by the Ravallion methods. The difference between the Ravallion and author's average urban U-R COL gap can be decomposed into:

5.8b $$P_R^{\Sigma} - P_A^{\Sigma} = (1-\alpha_R)\left(P_R^N - P_A^N\right) + (\alpha_R - \alpha_A)\left(P^F - P_A^N\right)$$

$$\Rightarrow \; 1.8 \cong 0.233(10.2)+(0.055)(-5.9)$$

$$\cong 2.38 + (-\,0.32) = 2.06$$

The first number in the right hand side indicates the bulk of the difference between the author's U-R COL gap and Ravallion's is due to the difference in non-food prices (10.2 percentage points). But because the weight on non-food prices in the Ravallion LPL is low (0.233), this large difference in non-food prices contributes only 2.38 percentage points to the difference between the author's U-R COL gap and Ravallion's.

5.5. Summary and Conclusions

This chapter demonstrates the existence of the bias of the Ravallion lower and upper poverty lines in Indonesia in 2002. A regression of the bias of the lower poverty line (LPL) on the relative price (food to non-food price) indicates the coefficient of the relative price is positive and statistically significant at the 1% level. Every increase in the relative price by 1 per cent leads to a positive 0.24 per cent bias in the LPL. Another regression of the bias of the UPL on the same relative price is also positive, but significant only at the level of 11%. Every 1 per cent rise in the relative price results in a 0.19 per cent bias in the UPL.

The biases in the Ravallion poverty lines are not very large on average, but they generate quite large biases in estimated poverty incidence in some regions compared to the UCPL. The reason is that the biases in the poverty lines for some regions were more than 5 per cent in absolute terms and household expenditure was heavily skewed toward low expenditure groups. In regions where the relative price of food to non-food was more than 100, poverty incidence for 2002 estimated using the Ravallion LPL was 1.9 percentage points higher than for the UCPL(L) estimates – 24.5 percent for the LPL and 22.7 for the UCPL(L). For these same regions, poverty incidence using the Ravallion UPL was 2.6 percentage points higher than for the UCPL(U) estimates – 33.8 percent for the UPL and 31.2 percent for the UCPL(U). Conversely, for regions where the relative price of food was below 100, average poverty incidence according to the Ravallion LPL was 2.3 percentage points less than for the UCPL(L) - 28.7 per cent for the Ravallion LPL and 30.9 percent for the UCPL(L). For the same regions, the Ravallion UPL implied poverty incidence was 37.6 percent, while the UCPL(U) implied it was 39.9 percent.

The deviation in poverty incidence between the Ravallion and UCPL estimates is quite a strong indication that it is important to have data on non-food prices in order to estimate a utility consistent poverty line.

Appendix 5.1: The summary statistics of demographic variables and regression results

Table A5.1: The estimated parameters of the food share equation

Independent variable: Food share	Estimated Parameters
Constant	0.796 (146.79)**
Ln (expenditure/FPL)	-0.025 (9.45)**
Square of Ln (expenditure/FPL)	-0.049 (29.49)**
Demographic variables:	
A. # Household members in several categories	
# Worker within household	0.01 (14.83)**
# Children under 4 years	0.005 (4.84)**
# Children 5-9 years	-0.001 -0.78
# Teenager, 9-14 years	-0.007 (7.85)**
# Adult, 15-64 years	-0.011 (19.14)**
# Aged, above 64 years	-0.013 (12.66)**
B. The dummy variables of households characteristics:	
1. Household head education: (Not completed primary school=0)	
Primary School	-0.011 (8.09)**
Junior High School	-0.022 (11.35)**
Senior High School	-0.041 (18.41)**
Vocational	-0.04 (13.15)**
Diploma (1-2 years)	-0.06 (9.37)**
Diploma (3 years)	-0.054 (9.85)**
Undergraduate (4 years)	-0.066 (15.91)**

Continued ...

Master/Doctor	-0.095 (7.02)**
2. Household head marital status (Single = 0):	
Married	-0.044 (9.59)**
Divorced	-0.02 (3.41)**
Widow	-0.026 (5.20)**
3. Household head gender: (Female = 0)	
Male	0.046 (14.64)**
The regional dummies:	
1. Urban-rural (rural = 0)	-0.029 (23.46)**
2. Province: (N Sumatra = 0)	
S Sumatra	-0.03 (10.22)**
Lampung	-0.047 (16.49)**
W Java	-0.06 (27.83)**
C Java	-0.074 (34.73)**
E Java	-0.07 (33.08)**
W Nusa T	-0.007 (2.48)*
S Kalimantan	0.006 (2.03)*
N Sulawesi	-0.04 (11.29)**
S Sulawesi	-0.037 (13.59)**
Observations	37390
R-squared	0.37
Robust t statistics in parentheses	
* Significant at 5%; ** Significant at 1%	

Notes: These results are based on a regression with robust standard errors, which is used to make the estimated variance efficient due to a heteroskedasticity problem (the numbers in the parenthesis are the robust *t*- statistics). Including the square of y/FPL increases the overall fit of the regression.

Source: Author's estimation

Table A5.2: Summary statistics of the demographic variables and another two key variables in the regression equation of the Ravallion method

Variables	Obs.	Mean	Std. Dev.	Min	Max
The demographic variables derived from the lowest 30 per cent nominal per capita expenditure					
A. Number of household members under several categories:					
# Worker	13253	1.85	1.05	0	10
# Children, (below 5 years)	13253	0.47	0.64	0	4
# Children, (5-9 years)	13253	0.55	0.70	0	4
# Children, (10-14 years)	13253	0.55	0.72	0	5
# Adult, (15-64 years)	13253	2.55	1.27	0	13
# Aged, (above 64 years)	13253	0.36	0.63	0	3
B. Dummy variables of households characteristics:					
1. Household head education:					
Not completed primary school	13253	0.47	0.50	0	1
Primary school	13253	0.37	0.48	0	1
Junior high school	13253	0.09	0.29	0	1
Senior high school	13253	0.04	0.20	0	1
Vocational high school	13253	0.02	0.13	0	1
Undergraduate (1-2 years)	13253	0.00	0.04	0	1
Undergraduate (3 years)	13253	0.00	0.03	0	1
Graduate (4 years)	13253	0.00	0.05	0	1
Post graduate (Master & Doctor)	13253	0.00	0.01	0	1
2. Household head marital status:					
Single	13253	0.01	0.09	0	1
Married	13253	0.87	0.33	0	1
Divorced	13253	0.02	0.14	0	1
Widowed	13253	0.10	0.30	0	1
3. Household head gender:					
Female	13253	0.12	0.32	0	1
Male	13253	0.88	0.32	0	1
All sample (ten provinces)					
Food share	37390	0.66	0.13	0.02	0.96
Food share at around FPL (Urban) [a)]	345	0.68	0.09	0.41	0.89
Food share at around FPL (Rural) [a)]	1151	0.72	0.08	0.40	0.93
Ratio of per capita expenditure to FPL	37390	2.16	1.55	0.35	58.25

Notes:

a) It is calculated based on households, which $0.95 < [y(h)/FPL(h)] < 1.05$

Source: Susenas 2002

Table A5.3: The summary statistics of the demographic variables used to estimate regional food shares

Variable [a]	N Sumatra		S Sumatra		Lampung		W Java		C Java		E Java		W Nusa T		S Kalimantan		N Sulawesi		S Sulawesi	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
# Household members in several categories																				
# Worker	1.63	1.92	1.57	1.91	1.64	1.90	1.46	1.40	1.71	1.83	1.61	1.78	1.54	1.59	1.57	1.93	1.29	1.49	1.53	1.66
# Children, (below 5 years)	0.44	0.51	0.45	0.35	0.48	0.39	0.38	0.34	0.35	0.33	0.30	0.30	0.41	0.40	0.34	0.33	0.29	0.32	0.38	0.41
# Children, (5-9 years)	0.47	0.60	0.49	0.48	0.45	0.47	0.46	0.39	0.37	0.39	0.30	0.32	0.43	0.45	0.40	0.41	0.33	0.35	0.41	0.47
# Children, (10-14 years)	0.50	0.58	0.51	0.52	0.46	0.48	0.39	0.37	0.41	0.42	0.31	0.32	0.47	0.46	0.36	0.43	0.31	0.38	0.50	0.50
# Adult, (15-64 years)	2.84	2.46	2.84	2.57	2.71	2.53	2.63	2.17	2.50	2.27	2.43	2.27	2.45	2.19	2.55	2.40	2.43	2.42	2.81	2.60
# Aged, male (above 64 years)	0.31	0.30	0.28	0.25	0.24	0.26	0.22	0.31	0.38	0.42	0.34	0.40	0.26	0.26	0.19	0.23	0.27	0.31	0.27	0.39
The dummy variables of households characteristics:																				
1. Household head education:																				
Not completed primary school	0.13	0.26	0.11	0.34	0.20	0.40	0.18	0.37	0.31	0.46	0.26	0.52	0.44	0.54	0.17	0.41	0.10	0.22	0.19	0.47
Primary school	0.24	0.34	0.29	0.44	0.29	0.36	0.30	0.48	0.28	0.38	0.27	0.34	0.19	0.25	0.27	0.37	0.17	0.38	0.22	0.29
Junior high school	0.22	0.20	0.19	0.12	0.16	0.14	0.14	0.08	0.15	0.08	0.15	0.07	0.12	0.09	0.17	0.11	0.19	0.18	0.15	0.11
Senior high school	0.25	0.13	0.25	0.06	0.19	0.06	0.22	0.03	0.12	0.03	0.16	0.03	0.15	0.08	0.19	0.05	0.38	0.16	0.24	0.06
Vocational high school	0.08	0.05	0.08	0.02	0.07	0.03	0.07	0.02	0.07	0.02	0.08	0.02	0.04	0.02	0.11	0.03	0.08	0.04	0.06	0.03
Undergraduate (1-2 years)	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.02	0.01	0.01	0.01	0.01	0.01
Undergraduate (3 years)	0.02	0.01	0.02	0.00	0.02	0.00	0.04	0.00	0.03	0.00	0.01	0.00	0.01	0.00	0.02	0.00	0.00	0.01	0.03	0.01
Graduate (4 years)	0.06	0.01	0.06	0.01	0.07	0.01	0.05	0.01	0.03	0.01	0.06	0.01	0.03	0.01	0.05	0.01	0.05	0.01	0.10	0.02
Post graduate (Master & Doctor)	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00
2. Household head marital status:																				
Single	0.03	0.01	0.06	0.02	0.02	0.01	0.02	0.01	0.02	0.01	0.06	0.01	0.04	0.01	0.06	0.03	0.06	0.01	0.12	0.03
Married	0.83	0.83	0.85	0.88	0.88	0.91	0.88	0.88	0.82	0.85	0.79	0.83	0.82	0.85	0.83	0.83	0.85	0.90	0.75	0.82
Divorce	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.03	0.02	0.02	0.03	0.03	0.04	0.02	0.02	0.02	0.00	0.02	0.02
Widow	0.13	0.14	0.07	0.08	0.09	0.07	0.07	0.09	0.13	0.12	0.13	0.13	0.10	0.09	0.09	0.12	0.07	0.09	0.11	0.12

Continued..

3. Household head gender:																				
Female	0.13	0.14	0.11	0.09	0.10	0.08	0.10	0.11	0.15	0.13	0.16	0.15	0.17	0.18	0.12	0.12	0.11	0.07	0.16	0.13
Male	0.87	0.86	0.89	0.91	0.90	0.92	0.90	0.89	0.85	0.87	0.84	0.85	0.83	0.82	0.88	0.88	0.89	0.93	0.84	0.87

Notes:

a) These summary statistics are derived from the lowest 30 per cent nominal per capita expenditure

Source: Recalculated from Susenas 2002

Appendix 5.2: Key results of this chapter when a mean of demographic variables for *all regions* is used to estimate the regional food-shares instead of that for the specific region

As mentioned in the main text, using the average values of the demographic variables for all regions ($\bar{x}_{(30)}$) instead of that for the specific region ($\bar{x}_{(30)}(j)$) in estimating the regional food-shares -$\hat{\alpha}(j)$- implies the only causes for regional differences in food-shares are the provincial and urban/rural dummy variables. This point can be seen from Table A5.4. As can be seen from this table, the regional food shares in discussion (column 2) are decomposed into the food shares at the base region (column 3), the provincial dummy variables (column 4) and the urban-rural dummy variables (column 5). That is, in each row, the value in column 2 is the sum of the values in columns 3, 4, and 5. The only differences across the regional food-shares (column 2) are the provincial and urban/rural dummy variables (Columns 4 and 5).

Table A5.4: Decomposition of the regional food shares into the food-share at the base region and the regional dummy variables

Provinces	Food share [a]	Food share at the base regions [b]	Provincial dummy coefficients [c]	Urban-rural dummy coefficients [d]
(1)	(2)	(3)	(4)	(5)
URBAN AREAS				
N Sumatra	0.741	0.770	0.000	-0.029
S Sumatra	0.711	0.770	-0.030	-0.029
Lampung	0.694	0.770	-0.047	-0.029
W Java	0.681	0.770	-0.060	-0.029
C Java	0.667	0.770	-0.074	-0.029
E Java	0.671	0.770	-0.070	-0.029
W Nusa T	0.734	0.770	-0.007	-0.029
S Kalimantan	0.747	0.770	0.006	-0.029
N Sulawesi	0.701	0.770	-0.040	-0.029
S Sulawesi	0.704	0.770	-0.037	-0.029
RURAL AREAS				
N Sumatra	0.770	0.770	0.000	0.000
S Sumatra	0.740	0.770	-0.030	0.000
Lampung	0.723	0.770	-0.047	0.000
W Java	0.710	0.770	-0.060	0.000
C Java	0.696	0.770	-0.074	0.000
E Java	0.700	0.770	-0.070	0.000
W Nusa T	0.763	0.770	-0.007	0.000
S Kalimantan	0.776	0.770	0.006	0.000
N Sulawesi	0.730	0.770	-0.040	0.000
S Sulawesi	0.733	0.770	-0.037	0.000

Notes:

a) Regional food-shares defined as: $\hat{\alpha}(j) = \hat{\beta} + \bar{x}_{(30)}\hat{\pi} + \hat{\phi} + \hat{\delta}_j$. Note this equation uses the average values of the demographic variables for all regions ($\bar{x}_{(30)}$) instead of for the specific region ($\bar{x}_{(30)}(j)$) as in equation 5.2.

b) As indicated in the regression coefficients reported in Table A5.1 of Appendix 5.1, the base region is rural North Sumatra. The numbers in this column represent the first two terms of right hand side (RHS) of equation in point 'a' above.

c) The coefficients of provincial dummy variables ($\hat{\delta}_j$) as reported in Table A5.1.

d) The coefficients of urban/rural dummy variables ($\hat{\phi}$) as reported in Table A5.1.

Source: As indicated in the notes

Based on these food-shares, the author re-calculated the LPL, the regional food-shares for estimating the UPL, and the UPL as well as all relevant price indices before estimating the scatter diagram of the biases of the Ravallion LPL and UPL (similar to Figure 5.2) and the deviation of the poverty incidence generated by these LPL and UPL from the UCPL estimates (similar to Table 5.5). The scatter diagrams are shown in Figure A5.1 and the estimate for the deviations are in Table A5.5.

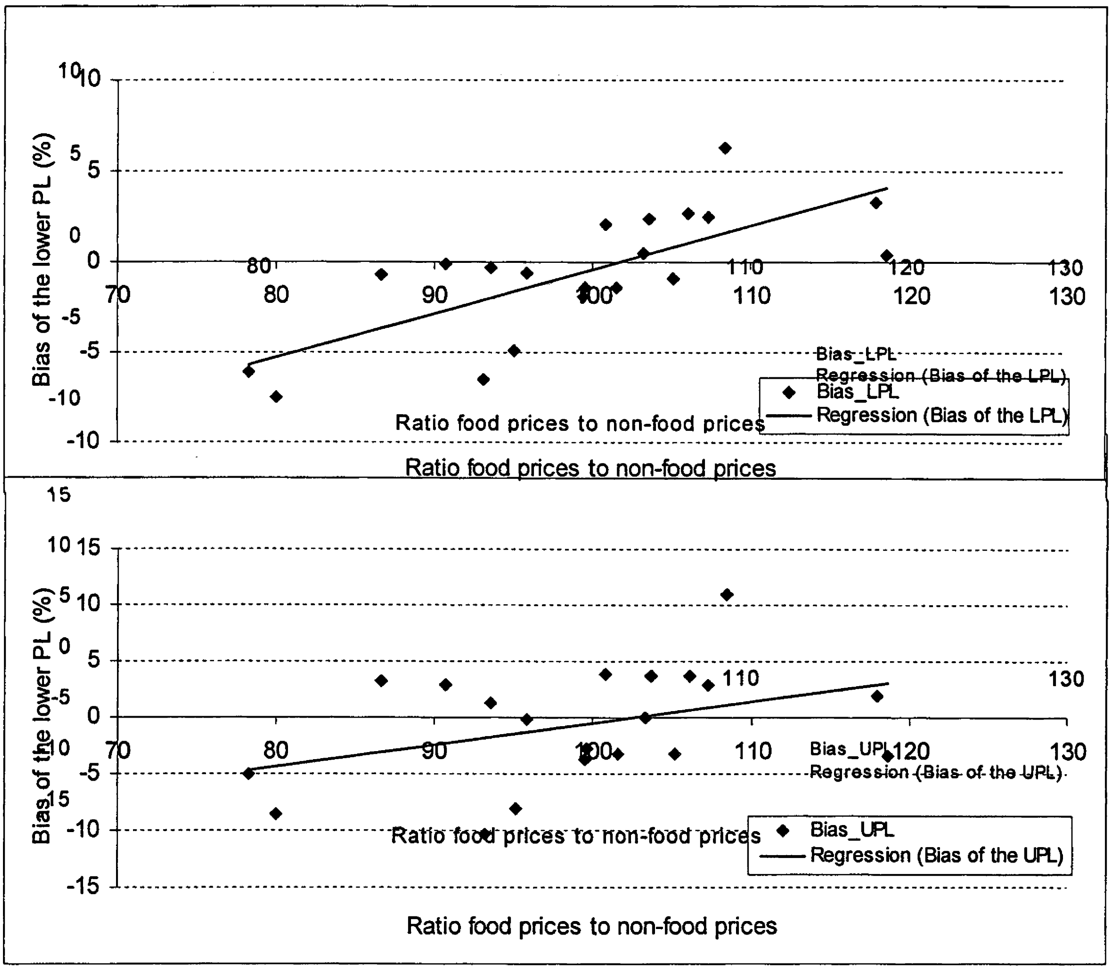
The scatter diagram looks no different from the ones reported in the main text. The interesting point is that the bias of the Ravallion UPL is now stronger than the one reported in the main text. Below are the regression results indicating the biases of the Ravallion LPL and UPL based on these food-shares. As can be seen from the second regression results, the magnitude of the coefficients of the bias of the UPL is larger than reported in the main text and the coefficients are now significant at the level of 10%. Moreover, the coefficients of determination of both regressions are slightly larger than the ones reported in the main text. That is, the R-square of the bias of LPL is larger by 2 percentage points, becomes 53 per cent and the bias of UPL is larger by 2 percentage points, becomes 15 per cent.

$$b^{LPL} = -24.6 + 0.24\,p$$
$$(-4.60)^{*} \quad (4.51)^{*} \qquad R^2 = 0.53 \quad N=20$$

$$b^{UPL} = -19.6 + 0.19\,p$$
$$(-1.86)^{***} \quad (1.81)^{***} \qquad R^2 = 0.15 \quad N=20$$

where variables are defined corresponding to the ones defined in the main text. The figures in the brackets are t-statistics; * and *** indicate significant at the 1% and 10% levels.

Figure A5.1: Scatter diagram of the relative prices with the bias of the Ravallion LPL and UPL based on the food-share derived from the national mean of demographic variables



Source: re-estimated from Tables 5.2, 5.3, and 5.4

The deviations of the poverty incidence based on the Ravallion LPL and UPL derived from these food shares indicate little change from the one reported in the main text. In regions where the relative price of food to non-food was more than 100, poverty incidence estimated using the Ravallion LPL was 1.6 percentage points higher than for the UCPL(L) estimates. For these same regions, poverty incidence using the Ravallion UPL was 1.5 percentage points higher than for the UCPL(U) estimates. Conversely, for regions in which the relative price of food was below 100, average poverty incidence according to the Ravallion LPL was 2.4 percentage points less than for the UCPL(L) and for the same regions, the Ravallion UPL implied poverty incidence was 3 percentage points lower than for the UCPL(U). See Table A5.5 below.

Table A5.5: Poverty incidence in 2002 derived from the Ravallion LPL and UPL methods compared to the corresponding estimates from the UCPL(L) and UCPL(U) approaches using food-shares derived from the national mean of demographic variables (%)

Province [a]	Area	Poverty incidence (%)			Poverty incidence (%)		
		LPL [b]	UCPL(L) [c]	difference [d]	UPL [e]	UCPL(U) [f]	difference [g]
Regions in which the relative prices of food to non-food exceeds 100:							
N Sumatra	Rural	35.2	34.8	0.4	41.3	44.3	-2.9
S Sulawesi	Rural	47.8	44.3	3.4	58.4	56.7	1.7
C Java	Urban	21.0	16.8	4.2	33.4	23.9	9.5
S Sumatra	Urban	16.4	14.6	1.8	21.9	20.8	1.1
S Sulawesi	Urban	11.1	8.5	2.6	19.9	17.1	2.8
S Kalimantan	Urban	3.6	4.3	-0.6	7.3	9.1	-1.8
E Java	Rural	35.4	32.9	2.5	47.5	43.7	3.8
Lampung	Rural	40.4	40.3	0.2	51.2	51.2	0.0
N Sumatra	Urban	10.7	11.5	-0.8	15.1	17.5	-2.4
Lampung	Urban	21.8	19.7	2.1	32.6	29.3	3.4
Simple average for above regions		24.3	22.8	1.6	32.9	31.3	1.5
Regions in which the relative prices of food to non-food less than 100:							
W Nusa T	Urban	35.0	36.0	-1.0	41.3	44.0	-2.7
S Sumatra	Rural	38.1	40.7	-2.6	47.8	51.0	-3.1
W Java	Rural	27.7	28.4	-0.7	39.0	39.2	-0.2
W Nusa T	Rural	39.0	44.4	-5.3	46.5	56.0	-9.5
C Java	Rural	36.3	36.6	-0.3	49.5	47.9	1.6
S Kalimantan	Rural	18.6	22.0	-3.4	22.0	29.4	-7.4
W Java	Urban	14.5	14.5	0.0	22.0	20.5	1.5
E Java	Urban	20.3	20.7	-0.4	30.6	28.5	2.1
N Sulawesi	Rural	39.6	46.8	-7.2	48.5	57.3	-8.8
N Sulawesi	Urban	17.3	20.3	-3.1	24.0	27.6	-3.6
Simple average for above regions		28.6	31.0	-2.4	37.1	40.1	-3.0

Notes as for Table 5.5 in the main text

Source: Author's estimates

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Chapter 6

Backcasting SCOLI from 2002 to Earlier SUSENAS Years

6.1. Introduction

This chapter details steps 6a and 6b of Section 3.5 (Chapter 3), which are the last steps in constructing the spatial cost of living index (SCOLI). This is to estimate the SCOLI for each region (urban and rural areas for each province) for each Susenas year: 1987, 1990, up to 1999. In doing so, the SCOLI for 2002 reported in Table 4.10 of Chapter 4 was backcast to get SCOLI for 1999, and then the SCOLI for 1999 was backcast to get SCOLI for 1996, and so forth back to 1987. This was done by constructing a '***provincial CPI***' (which is a population weighted average of ***P_urb_179*** and ***P_rur_68)***[1] and was the preferred method for backcasting as indicated in step 6a. ***P_urb_179*** and ***P_rur_68*** are urban and rural CPI, respectively, estimated by the author using data on prices of individual items and Susenas weights. Alternatively, the backcasting was done by applying the official 'urban CPI' and 'rural CPI' as indicated in step 6b. The two indexes are referred to as SCOLI-A (the preferred index) and SCOLI-B (the alternative index).

The chapter is organized as follows. The methodology and data used to backcast are set

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[1] As mentioned in Section 1.2 of Chapter 1, the term SCOLI is used to refer price variations across regions and CPI is used to refer price variations over time.

out in Section 6.2 and the results of backcasting are reported in Section 6.3. Section 6.4 compares the SCOLI derived using the preferred and the alternative methods and explains the causes of discrepancies between the two methods. The last section summarizes and concludes.

6.2. Methodology and data

The ideal way to construct the SCOLI for each Susenas year is to conduct a price survey with emphasis on comparability of the commodities under consideration in the manner of the one carried out by the author to produce the SCOLI 2002 reported in Table 4.10 of Chapter 4. So far, there are no published studies trying to measure cost of living in urban and rural areas for each province in Indonesia, except Arndt and Sundrum (1975) who studied spatial variations in the cost of living, but for urban areas only. This thesis approaches the previous SCOLI through backcasting from 2002 to each Susenas year back to 1987. Because price surveys of *comparable* items have not been undertaken across Indonesian regions for earlier years, backcasting is necessarily very imperfect. All the alternative possible data sources have serious problems that are explained below. It is therefore necessary to recognise the inevitable scope for possibly large errors in the resulting estimates of poverty. Because of the existence of alternative and conflicting data sources for backcasting, this thesis reports the results of two methods, the 'preferred method' (step 6a) and the 'alternative method' (step 6b).

6.2.1. Methodology 1: Preferred method

To aid in understanding the backcasting process, the two equations in step 6a of Section 3.5 (Chapter 3), are repeated here as equations 6.1a and 6.1b:

6.1a $$\frac{\widetilde{P}(j,t)}{\widetilde{P}(j,t-3)} = \omega(j,t)\frac{P^*(j,t)}{P^*(j,t-3)} + [(1-\omega(j,t)]\frac{P^*(j+1,t)}{P^*(j+1,t-3)},$$

for j = 1, 3, 5, ..., 51, i.e., urban areas in 25 provinces and Jakarta (j = 51) (this thesis excludes East Timor).

6.1b $$\frac{\widetilde{P}(j,t)}{\widetilde{P}(j,t-3)} = \frac{\widetilde{P}(j-1,t)}{\widetilde{P}(j-1,t-3)},$$ for j = 2, 4, 6, ..., 50, i.e., for rural areas in all 25 provinces.

where $\widetilde{P}(j,t)$ is the SCOLI for each region j; t is one of the Susenas years (e.g., 1990, 1993, etc.); $\omega(j,t)$ is the share of the urban population to the total population in the province to which j refers. For j = 1, 3, 5, ..., 51, i.e., all urban areas, $P^*(j,t)$ is the urban CPI (referred as ***P_urb_179***); and for j = 2, 4, 6, ..., 50, i.e., for rural areas, $P^*(j,t)$ is rural CPI (referred as ***P_rur_68***).[2] The derivations of the series ***P_urb_179*** and ***P_rur_68*** are described in equation 6.2a and 6.2b below. Both series are constructed

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[2] It should be noted that 'urban inflation rates' ('urban CPI') are not common terms in describing price changes in Indonesia. The common term is 'inflation rate' without 'urban', which refers to the inflation rate derived from 43 cities (as per 2002) across Indonesia. The term 'urban inflation rates' is used here to make a distinction with inflation rates for rural areas – 'rural inflation rates'. Therefore, 'urban inflation rates' used here describes the same reference as 'inflation rates' used in common practice.

by the author from the raw-CPI price data. That is, the data collected by BPS to construct the CPI series and published in units of Rupiah/kg, or Rupiah/piece, etc. (The data will be detailed in Sub-section 6.2.3.1).

To clarify equations 6.1a and 6.1b, consider Aceh. Urban Aceh is region 1 and rural Aceh is region 2. Equation 6.1a makes the inflation rate for urban Aceh, $\frac{\widetilde{P}(1,t)}{\widetilde{P}(1,t-3)}$, equal to a population weighted average of ***P_urb_179*** and ***P_rur_68*** for Aceh. This weighted average will be referred to here as the '***provincial CPI***'. The reasons for *not* making the inflation rate for urban Aceh depend only on ***P_urb_179*** are explained later in this Sub-section. Equation 6.1b makes the inflation rate for rural Aceh (Region 2) is equal to the inflation rate for urban Aceh (Region 1).

The changes in ***P_urb_179*** and ***P_rur_68*** are defined as:

6.2a $$\frac{P\_urb\_179(j,t)}{P\_urb\_179(j,t-3)} = \sum_{i=1}^{N} s^j(i,t-3)\frac{p'(i,j,t)}{p'(i,j,t-3)},$$

for $j = 1, 3, 5, \ldots, 51$, i.e., all urban areas;

6.2b $$\frac{P\_rur\_68(j,t)}{P\_rur\_68(j,t-3)} = \sum_{i=1}^{N} s^j(i,t-3)\frac{p'(i,j,t)}{p'(i,j,t-3)},$$

for $j = 2, 4, 6, \ldots, 50$, i.e., all rural areas.

where i is an item of consumption (e.g., rice, cassava, eggs, T-shirts, etc.); $p'(i,j,t)$ is the BPS raw-CPI price of the item in the relevant region and year; N is the number of items of consumption on which the relative prices for adjacent Susenas years (i.e., t

and *t-3*) can be calculated;[3] and $s^j(i,t-3)$ is the share of the item in the consumption of poor people derived from Susenas data (referred as Susenas-weights), so that for any j and t:

$$6.3 \qquad \sum_{i=1}^{N} s^j(i,t-3) = 1$$

Note that in all urban areas ($j \in U$, U is the set of urban areas), $s^j(i,t-3) = s^U(i,t-3)$ and in all rural areas ($j \in R$, R is the set of rural areas), $s^j(i,t-3) = s^R(i,t-3)$. However, $s^U(i,t-3) \neq s^R(i,t-3)$. This is inevitable since N differs across urban and rural areas.

The application of equations 6.1a and 6.1b is straightforward as illustrated in Figure 6.1 with East Java province as an example. The SCOLI 2002 for *urban* East Java was estimated at 111.0, while the SCOLI for *rural* East Java was estimated at 93.2. Both numbers use rural Indonesia 2002 = 100 as a base. So, the U-R COL gap[4] for East Java for 2002 was estimated at 19.1 per cent ((111.0-93.2)/93.2). Using equation 6.1a, the ratio of ***provincial CPI*** for East Java in 2002 relative to 1999 was estimated at 1.301,

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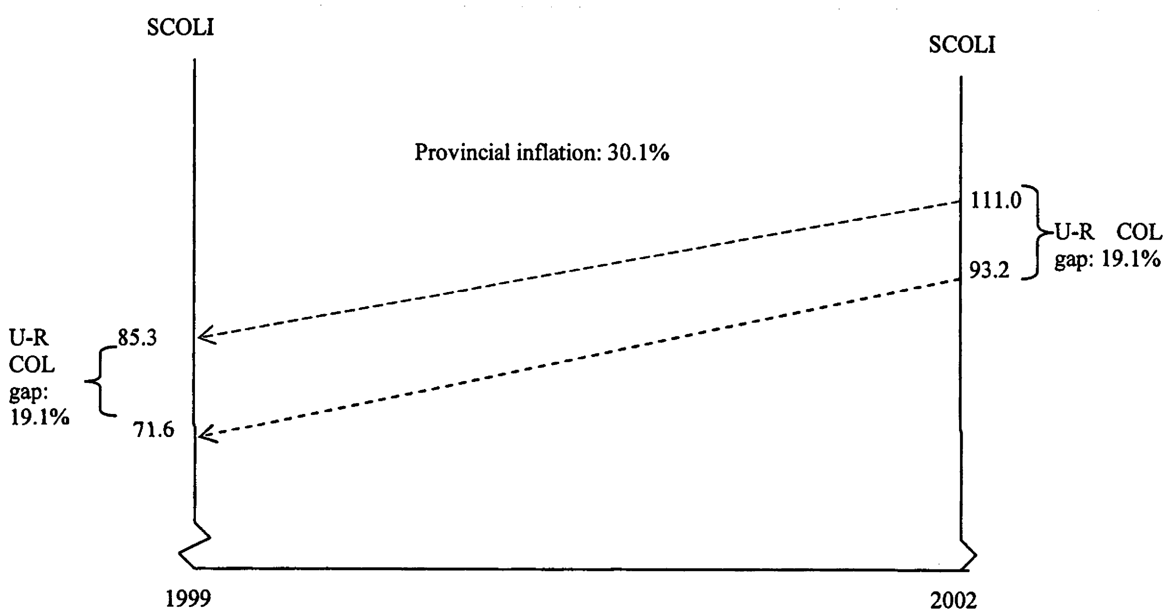
[3] N varies across urban and rural areas and also varies over time. That is, N = 179 for urban and 68 for rural if t = 2002; N = 130 for urban and 68 for rural if t = 1999; N = 136 for urban and 62 for rural if t = 1996; N = 100 for urban and 62 for rural if t = 1993; and N = 64 for urban and 62 for rural if t = 1990. N reported here is the number of prices actually used to estimate the relative prices for adjacent years (as indicated by the right hand side of equations 6.2a and 6.2b). The actual number of published prices in each region for each year was slightly larger than N.

[4] As defined in previous chapters, it is the percentage excess of the urban SCOLI over the rural SCOLI.

indicating the inflation in this region during that period was 30.1 per cent (or 9.2 per cent per year). With the SCOLI for 2002 of 111.0, the SCOLI for the *urban* East Java for 1999 was estimated at 85.3 (=111.0/1.301). Likewise, with the SCOLI for 2002 of 93.2, the SCOLI for *rural* East Java for 1999 was estimated at 71.6 (=93.2/1.301).

Figure 6.1: Backcasting the SCOLI 2002 for East Java to get SCOLI for 1999



Source: Author's estimates

So, having the change in ***provincial CPI*** for j from 1999 to 2002 and with $\widetilde{P}(j,2002)$ set at the values given in Table 4.10 of Chapter 4, equation 6.1a gives estimates for $\widetilde{P}(j,1999)$. Having $\widetilde{P}(j,1999)$ and the change in ***provincial CPI*** for j from 1996 to

1999, equation 6.1a is re-applied to derive $\widetilde{P}(j,1996)$ and so on and so forth to derive $\widetilde{P}(j,1993)$, $\widetilde{P}(j,1990)$, and $\widetilde{P}(j,1987)$. The resulting indexes over time and across regions are SCOLI-A.

Equations 6.1a and 6.1b make an assumption that the inflation rates in urban and rural areas in each province from 1987 to 2002 are identical. (The term ***'provincial CPI'*** comes from this assumption). This implies the U-R COL gap in the province is constant over time. This assumption is not true literally, since the relative prices between urban and rural areas changed over time.

However, this is a compromise approach that is probably best to deal with the problems that arose in the process of backcasting using alternative data sources. The problems were a 'paradoxical cross-over' problem on the one hand and an excessive U-R COL gap on the other hand. 'Paradoxical cross-over' is used here to mean that in some years, the rural SCOLI was estimated to exceed the urban SCOLI. Given that the urban cost of living exceeds the rural cost of living in every province in 2002, this crossover problem can only occur if the estimated urban inflation between year *t* and 2002 exceeds the estimated rural inflation in the same province for the same period. The 'paradoxical cross-over' problems arose when the backcasting was using ***P_urb_179*** for urban areas and was using ***P_rur_68*** for rural areas; and the excessive U-R COL gap arose when the backcasting was using another estimate of urban CPI, ***P_urb_7***. (This variable along with the reasons for taking the compromise approach are detailed in Appendix 6.1). That is, the excessive gap arose when the backcasting was using ***P_urb_7*** rather than ***P_urb_179*** for urban areas and kept using ***P_rur_68*** for rural areas. The U-R COL gap in 1987 was much higher than it was in 2002.

Moreover, since the population lives in both urban and rural areas, the backcasting should use both the urban and rural price index. Therefore, from this point of view, the use of ***provincial CPI*** is also possibly the best compromise approach rather than using either the urban price index or rural price index alone.

6.2.2 Methodology 2: Alternative method

The alternative method uses the published CPI data as indicated in step 6b of Section 3.5 (Chapter 3). The equation is repeated here as equation 6.4:

6.4 $$\frac{\tilde{\tilde{P}}(j,t)}{\tilde{\tilde{P}}(j,t-3)} = \frac{P'(j,t)}{P'(j,t-3)}, \qquad \text{for } j = 1, \ldots, 51$$

where $P'(j,t)$ is the ***urban BPS CPI*** if j is an urban area and is the ***rural BPS CPI*** if j is a rural area. For rural areas, the only published CPI estimates are for Java and off-Java. If j is a rural area on Java, $P'(j,t)$ is the on-Java CPI and if j is a rural area off-Java it is the off-Java CPI. The series derived by backcasting with equation 6.4 is referred to as SCOLI-B.

There are three reasons why this is not the preferred method. First, it produces paradoxical estimates in 1999, in the sense that the implied U-R COL gaps in 11 provinces are negative in that year; and it also produces implausibly large U-R COL gaps in 1987. The implied average U-R COL gap in 1987 was very large, 70 per cent. Second, the ***urban BPS CPI*** is not suitable for the purpose of applying UCPL (i.e., for the backcasting). The reason being the CPI is designed to estimate price changes experienced by average households, whereas the CPI needed in applying the UCPL is the one for low-income households. Third, ***rural BPS CPI*** is too general for applying the UCPL method. As mentioned there are only two rural CPI for all Indonesia, i.e., one CPI for rural Java and another for rural non-Java.

6.2.3. Data description and sources

This section describes what price data and sources of data were used to estimate ***P_urb_179*** and ***P_rur_68*** as well as the official CPI used as the alternative method (Sub-section 6.2.3.1). In addition, this section explains some adjustments on the price data that were made by the author (sub-section 6.2.3.2), the approach taken when some price data were missing (sub-section 6.2.3.3), and the approach taken to deal with the outliers (sub-section 6.2.3.4).

6.2.3.1. Data descriptions and data sources

The raw-CPI price data reported by BPS and the estimated CPI are as follows:

- ***BPS raw price data on individual items in urban areas of each province***: These data are actual prices, measured in Rupiah per physical unit, for example, Rp/t-shirt or Rp/kg of rice as reported by BPS (1988; 1991a; 1994a; 1997a; 2000a; 2003a). In addition, some data were taken from CEIC Asia database. As explained in Section 4.2 of Chapter 4, these data are collected for the purpose of estimating the CPI for selected cities. In 2002, these data were collected in 43 cities across Indonesia including each provincial capital city for more than 300 items, but data were published for only slightly above 179 items in 2002, covering both food and non-food items. The exact number is slightly higher than 179, since a few items published in 1999 were different from the ones published in 2002. Therefore the relative prices of these items between the two years cannot be calculated. However, only price data collected in provincial capital cities were used in this study for estimating the urban CPI for each province. The urban CPI derived by the author from this official price data is ***P_urb_179***. This series uses the BPS raw price data for the 179 items combined with Susenas-weights.

- ***BPS raw price data on individual items in rural areas of most provinces***: These data are also actual prices, measured in Rupiah per physical unit as reported by BPS (1997b; 2003d) for about 68 items. The exact number is slightly different in some years. For some provinces, the rural price data for any individual items such as rice and T-shirts are not published, especially for early Susenas years. (This will be explained in the following sub-section). The CPI derived from this official price data is ***P_rur_68***. This series use the BPS raw price data for 68 items combined with Susenas-weights.

The alternative method described in step 6b uses the following data.

- ***Urban BPS CPI***: To estimate equation 6.4, the ***urban BPS CPI*** was the CPI for provincial capital cities taken from CEIC Asia database and various BPS publications (for example, BPS; 2000b; 2003b).[5] This is the official CPI for urban areas and is available on a monthly basis. The monthly series were then annualised by a simple average. The CPI is the aggregation of the raw price data on individual items of more than 300 items (see first bullet of the two above). The ***urban BPS CPI*** differs from the ***P_urb_179*** because the latter uses only published price data (179 items) and because the weights for ***urban BPS CPI*** are BPS-weights derived from cost of living survey (for example, see BPS 1990), whereas for ***P_urb_179*** uses Susenas-weights.

It is worth emphasing that ***urban BPS CPI*** for each province is an official series, published by BPS, whereas ***P_urb_179*** is an unofficial series constructed by the author from data published by BPS.

- ***Rural BPS CPI***: This is an official price index for rural areas and consists of two series only: rural CPI for Java and another rural CPI for non-Java. These series are reported on a monthly basis (taken from CEIC Asia database). The official term used to indicate the rural CPI is "general commodity price index", which is an aggregation of only 8 commodity price indices. To estimate equation 6.4, each of these two series was annualized by simple average and one identical ***rural BPS CPI*** was used for all provinces in Java and another identical ***rural BPS CPI*** was used for

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[5] The CEIC Asia Database reproduces in electronic form many BPS series that are otherwise only available in hard copy. Occasionally, the author had to supplement these electronic data using the BPS hard copies.

all other provinces. ***Rural BPS CPI*** differs from ***P_rur_68*** because it uses the price of only 8 individual items (not groups) rather than the 68 items for which data are published and also because it uses BPS-weights. In addition, ***P_rur_68*** comprises almost 23 separate series (the adjustments for provinces with no rural price data will be detailed in the next sub-section), whereas ***rural BPS CPI*** comprises only 2 separate series, Java and off-Java.

6.2.3.2. Adjustments for two individual prices and for prices in provinces for which BPS does not report rural price data

The costs of transportation were the first adjusted individual prices. To estimate ***P_urb_179*** for t = 1999 and previous years, it was approached by the BPS transportation index (sub index under the heading of miscellaneous group of CPI). This approach was taken because the definition of 'distance ride' changed from year to year, so that the relative prices for adjacent years differ wildly. The rental costs of housing were the second adjusted individual prices. They were published by BPS for 2002 only and for urban areas only. Therefore, the rental costs of housing for urban areas for the previous years were approached by the cost of housing index (sub index under the heading of housing group of CPI), meanwhile the same costs for rural areas were approached by the price of materials used to build houses, such as cement, iron sheeting, and so forth, since the costs of housing index are not available from the BPS publication.

The adjustments for prices in provinces for which BPS does not report the rural prices are as follows. The price changes in these provinces are assumed to be equal to the price changes in neighboring provinces. For example, the rural prices data for all years for rural Maluku and rural Papua were not reported. The inflation rates for these two rural areas are assumed to be the same as inflation in rural North Sulawesi, by proximity. Appendix 6.2 details the provinces, for which BPS does not report rural prices data and the neighboring provinces, from which the inflation rates are estimated.

6.2.3.3. Dealing with missing individual prices

For most items, i, BPS reports individual prices in each of the 26 provincial capital cities, but some individual prices are missing in some provinces. If, for some urban region, $j \in U$, $p'(i,j,t)$ is missing, set:

6.5
$$\frac{p'(i,j,t)}{p'(i,j,t-3)} = \frac{\sum_{j \in U^*} \frac{p'(i,j,t)}{p'(i,j,t-3)}}{26-m};$$

where U^* is the set of urban areas for which data on item i are available and m is the number of provinces, where the price of good i is missing, so that *26-m* is the number of provinces for which data on item i are available.

With this equation, the change in the price of item i in (urban) region j is assumed to be identical to the average change in the price i across other urban areas. For example, if the price of kerosene is missing in urban North Sumatra in year t, the relative price of kerosene in urban North Sumatra between two consecutive Susenas years is assumed to be identical with the average change in kerosene price across all other urban areas for which data are available, i.e., set U^*.

If for some rural region, $j \in R$, $p'(i,j,t)$ is missing, set:

$$\text{6.6} \qquad \frac{p'(i,j,t)}{p'(i,j,t-3)} = \frac{\sum_{j \in R^*} \frac{p'(i,j,t)}{p'(i,j,t-3)}}{25-n};$$

where R^* is the set of rural areas for which data on i are available and n is the number of provinces for which no rural price of item i. For some provinces, there are no rural price data on any items. These provinces are included in n. The interpretation of this equation is the same as for the previous equation.

6.2.3.4. Identification of outliers

The relative prices of some items between the two consecutive Susenas years in some cases seem implausible. For example, the price of rental housing in urban Central Sulawesi reported by BPS increased by a factor of 216 times between 1999 and 2002. This was 151 times higher than the average across urban areas (excluding that region), which was only 1.43. In this case, the relative price was apparently an outlier.

The following equations are identifications for an outlier and how to deal with it.

Let $\rho^U(i,j,t) = \frac{p'(i,j,t)}{p'(i,j,t-3)}$ if $j \in U$ and $\rho^R(i,j,t) = \frac{p'(i,j,t)}{p'(i,j,t-3)}$ if $j \in R$.

Let $\sigma^U(i,t)$ and $\mu^U(i,t)$ be the standard deviation and the mean across urban areas in year t for $\rho^U(i,j,t)$. Also, let $\sigma^R(i,t)$ and $\mu^R(i,t)$ be the standard deviation and the mean across rural areas in year t for $\rho^R(i,j,t)$.

For urban areas, if:

6.7 $$\rho^U(i,j,t) - \mu^U(i,t) > 1.96\ \sigma^U(i,t)$$

exclude $\rho^U(i,j,t)$, recalculate $\hat{\mu}^U(i,t)$, $\hat{\sigma}^U(i,t)$, and set:

6.7a $$\hat{\rho}^U(i,j,t) = \hat{\mu}^U(i,t) + 1.96\hat{\sigma}^U(i,t)$$; and if:

6.8 $$\rho^U(i,j,t) - \mu^U(i,t) < 1.96\ \sigma^U(i,t)$$

exclude $\rho^U(i,j,t)$, recalculate $\hat{\mu}^U(i,t)$, $\hat{\sigma}^U(i,t)$, and set:

6.8a $$\hat{\rho}^U(i,j,t) = \hat{\mu}^U(i,t) - 1.96\hat{\sigma}^U(i,t)$$

Likewise for rural areas, if:

6.9 $$\rho^R(i,j,t) - \mu^R(i,t) > 1.96\ \sigma^R(i,t)$$

exclude $\rho^R(i,j,t)$, recalculate $\hat{\mu}^R(i,t)$, $\hat{\sigma}^R(i,t)$, and set:

6.9a $$\hat{\rho}^R(i,j,t) = \hat{\mu}^R(i,t) + 1.96\hat{\sigma}^R(i,t)$$; and if:

6.10 $$\rho^R(i,j,t) - \mu^R(i,t) < 1.96\ \sigma^R(i,t)$$

exclude $\rho^R(i,j,t)$, recalculate $\hat{\mu}^R(i,t)$, $\hat{\sigma}^R(i,t)$, and set:

6.10a $$\hat{\rho}^R(i,j,t) = \hat{\mu}^R(i,t) - 1.96\hat{\sigma}^R(i,t)$$

6.3. The SCOLI for earlier Susenas years

This section reports two sets of SCOLI for all Susenas years. First is the SCOLI-A derived using the preferred method (i.e., the ***provincial CPI*** as shown in equations 6.1a and 6.1b). Second is the SCOLI-B derived using the alternative method (***urban BPS CPI*** and ***rural BPS CPI***).

6.3.1. The SCOLI-A derived using the preferred method

The SCOLI-A derived using the preferred method is reported in Table 6.1. Each index is a SCOLI for each region from 1987 to 2002 with a single base year of rural Indonesia 2002=100. The interpretation of the index is as follows. The SCOLI for urban Aceh in 1987 was estimated at 14.1. This means the nominal cost of living in urban Aceh for 1987 was 14.1 per cent of the one in average rural Indonesia in 2002. With regards to the UCPL approach, it also means the poverty line for urban Aceh in 1987 should be set at the level 14.1 per cent of the one for average rural Indonesia in 2002 in order to generate an identical utility level. As will be reported in Chapter 7, the average poverty line across rural Indonesia for 2002 was set at the level of Rp 101.9 thousand per capita per month. Therefore, the poverty line for urban Aceh for 1987 should be set at the level of Rp 14.3 thousand per capita per month.[6]

[6] Due to rounding, this poverty line is not exactly at 14.1 per cent of Rp 101.9.

Table 6.1: SCOLI-A 1987 – 2002 derived using ***provincial CPI*** (Rural areas 2002 = 100)

	Province	1987		1990		1993		1996		1999		2002	
		Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
1	Aceh	14.1)*	13.2	17.4	16.4	20.5	19.3	29.3	27.6	76.2	71.6	107.7	101.3
2	N Sumatra	13.2	12.4	16.6	15.6	21.4	20.2	30.1	28.3	78.7	74.0	109.4	102.9
3	W Sumatra	15.1	14.2	18.5	17.4	22.1	20.7	31.0	29.2	79.4	74.7	104.8	98.6
4	Riau	16.0	15.0	19.6	18.4	24.8	23.3	36.1	34.0	79.8	75.1	107.9	101.5
5	Jambi	14.4	13.5	17.6	16.4	22.5	21.1	29.1	27.3	74.4	69.6	98.6	92.3
6	S Sumatra	15.3	14.3	18.6	17.4	24.1	22.6	31.6	29.6	78.4	73.4	109.7	102.6
7	Bengkulu	15.4	13.8	20.0	18.0	24.0	21.7	34.2	30.9	81.1	73.1	106.7	96.2
8	Lampung	13.9	12.6	18.0	16.3	21.9	19.8	31.7	28.5	73.9	66.6	105.5	95.1
9	Jakarta	15.2	-	20.7	-	28.0	-	40.4	-	103.3	-	131.9	-
10	W Java	15.2	13.2	20.7	17.9	26.8	23.2	37.7	32.7	95.4	82.8	117.2	101.7
11	C Java	12.8	12.2	16.7	16.0	21.2	20.3	29.9	28.6	76.3	72.9	101.1	96.7
12	Yogyakarta	12.7	12.2	16.3	15.6	21.1	20.2	29.6	28.3	77.3	73.9	101.3	96.9
13	E Java	13.0	10.9	17.4	14.6	22.4	18.8	31.7	26.6	85.3	71.6	111.0	93.2
14	Bali	16.1	13.5	21.0	17.6	27.3	22.9	36.4	30.6	94.9	79.7	128.4	107.8
15	W Nusa T	13.0	12.2	16.2	15.3	20.5	19.3	27.8	26.2	77.5	72.9	104.5	98.3
16	E Nusa T	17.5	16.5	21.4	20.2	27.5	25.8	37.7	35.5	84.0	79.0	122.5	115.3
17	W Kalimantan	18.1	15.4	22.8	19.3	28.5	24.3	38.3	32.5	81.2	69.0	111.3	94.6
18	C Kalimantan	24.2	20.5	30.4	25.9	37.7	32.1	51.6	43.8	109.9	93.4	144.6	122.9
19	S Kalimantan	14.8	12.6	18.5	15.7	23.2	19.7	31.3	26.6	77.8	66.1	109.1	92.7
20	E Kalimantan	18.3	15.6	23.5	20.0	30.3	25.8	40.0	34.0	92.6	78.6	122.6	104.2
21	N Sulawesi	16.1	15.1	19.6	18.4	25.1	23.5	33.0	31.0	94.6	88.8	118.8	111.5
22	C Sulawesi	14.2	12.9	18.7	17.0	24.3	22.2	33.5	30.6	81.2	74.0	111.2	101.3
23	S Sulawesi	13.0	11.8	17.1	15.6	22.4	20.4	30.3	27.6	79.6	72.6	107.8	98.2
24	SE Sulawesi	14.1	12.9	18.9	17.2	24.5	22.3	33.5	30.5	87.0	79.3	116.9	106.6
25	Maluku	19.8	18.6	24.1	22.6	29.9	28.0	39.6	37.2	110.8	104.0	140.6	132.0
26	Papua	18.9	17.7	22.6	21.2	28.2	26.4	37.1	34.8	103.7	97.3	129.6	121.6
	INDONESIA)[a]	**14.4**	**12.9**	**18.9**	**16.7**	**24.5**	**21.3**	**34.4**	**29.7**	**87.7**	**75.6**	**113.3**	**100.0**
	U-R COL gap (%)	12.0		13.4		14.9		15.7		16.0		13.3	

Notes: *) That is, for example, the 14.1 for urban Aceh means that the (nominal) cost of living in urban Aceh in 1987 was estimated at the 14.1% of the level of average rural Indonesia in 2002

a) Population weighted average;

Source: Author's estimates

On average across provinces, urban and rural SCOLI-A in 1987 was 14.4 and 12.9, respectively. With the average rural Indonesia poverty line for 2002 of Rp 101.9 thousand, these indices mean that on average the urban and rural poverty line for 1987 was estimated at the levels of Rp 14.7 thousand and Rp 13.1 thousand per capita per month, respectively.

6.3.2. The SCOLI-B derived using the alternative method

The SCOLI-B derived using the alternative method is reported in Table 6.2. The interpretation is similar as in Table 6.1. The poverty line for urban Aceh, for example, according to SCOLI-B was 18.8 per cent of the one for rural Indonesia 2002 and therefore the utility consistent poverty line for this region was Rp 19.2 thousand per capita per month, 31 per cent higher compared to the poverty line derived from the first set, SCOLI-A.

Table 6.2: SCOLI-B 1987 – 2002 derived using the ***urban BPS CPI*** and ***rural BPS CPI*** (Rural areas 2002 = 100)

	Province	1987		1990		1993		1996		1999		2002	
		Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
1	Aceh	18.8	15.8	24.3	20.6	30.3	23.7	38.6	33.8	78.2	86.2	107.7	101.3
2	N Sumatra	19.2	16.1	24.4	21.0	31.1	24.0	39.3	34.3	84.2	87.5	109.4	102.9
3	W Sumatra	20.1	15.4	23.0	20.1	29.1	23.0	37.0	32.9	80.1	83.9	104.8	98.6
4	Riau	21.6	15.8	24.8	20.7	30.9	23.7	38.6	33.8	79.0	86.4	107.9	101.5
5	Jambi	22.3	14.4	25.8	18.8	31.8	21.6	39.4	30.7	78.0	78.5	98.6	92.3
6	S Sumatra	20.7	16.0	24.7	20.9	31.0	24.0	39.1	34.2	85.1	87.3	109.7	102.6
7	Bengkulu	22.7	15.0	26.4	19.6	33.0	22.5	40.8	32.0	85.8	81.8	106.7	96.2
8	Lampung	19.0	14.8	24.3	19.4	30.4	22.2	38.5	31.7	81.8	80.9	105.5	95.1
9	Jakarta	21.3	-	29.4	-	38.8	-	51.3	-	101.8	-	131.9	-
10	W Java	23.5	10.7	28.3	14.7	36.3	17.8	45.8	25.4	89.2	69.2	117.2	101.7
11	C Java	21.6	10.2	26.0	14.0	33.5	16.9	40.8	24.1	76.4	65.8	101.1	96.7
12	Yogyakarta	19.6	10.2	23.8	14.0	30.5	16.9	38.4	24.2	78.9	65.9	101.3	96.9
13	E Java	20.5	9.8	25.5	13.5	33.3	16.3	42.5	23.3	85.0	63.4	111.0	93.2
14	Bali	23.5	16.8	30.7	22.0	40.1	25.2	48.1	35.9	97.9	91.7	128.4	107.8
15	W Nusa T	18.5	15.3	23.8	20.0	31.5	23.0	40.0	32.8	85.4	83.6	104.5	98.3
16	E Nusa T	25.4	18.0	30.8	23.5	38.6	26.9	47.2	38.4	91.6	98.1	122.5	115.3
17	W Kalimantan	20.2	14.8	25.3	19.3	32.2	22.1	40.3	31.5	86.4	80.5	111.3	94.6
18	C Kalimantan	29.7	19.2	36.6	25.0	46.3	28.7	57.1	40.9	113.7	104.5	144.6	122.9
19	S Kalimantan	23.5	14.5	28.8	18.9	35.9	21.7	44.1	30.9	90.6	78.8	109.1	92.7
20	E Kalimantan	24.9	16.3	29.4	21.2	37.4	24.3	46.9	34.7	92.6	88.6	122.6	104.2
21	N Sulawesi	21.3	17.4	25.2	22.7	31.3	26.1	41.5	37.2	87.9	94.9	118.8	111.5
22	C Sulawesi	19.6	15.8	22.6	20.7	27.7	23.7	35.2	33.8	81.2	86.2	111.2	101.3
23	S Sulawesi	23.3	15.3	27.2	20.0	33.6	23.0	42.2	32.7	85.8	83.6	107.8	98.2
24	SE Sulawesi	20.2	16.6	23.6	21.7	31.8	24.9	39.9	35.5	90.6	90.7	116.9	106.6
25	Maluku	22.2	20.6	35.9	26.9	42.8	30.8	52.2	44.0	111.3	112.3	140.6	132.0
26	Papua	25.0	19.0	32.0	24.8	38.8	28.4	49.3	40.5	95.8	103.5	129.6	121.6
	INDONESIA)[a]	***21.7***	***12.8***	***26.9***	***17.1***	***34.6***	***20.1***	***43.8***	***28.9***	***87.2***	***76.2***	***113.3***	***100.0***
	U-R COL gap (%)	69.6		57.8		71.9		51.7		14.5		13.3	

Notes:

a) Population weighted average

Source: Author's estimates

Table 6.2 also shows the first of the three points mentioned in Sub-section 6.2.2, which suggest this alternative method is not preferable. That is, it generates implausibly large U-R COL gaps in some years (e.g., 1987 and 1993), but negative gaps in eleven provinces in 1999. All these 'paradoxical' negative U-R COL gaps occurred in non-Java provinces. The SCOLI-B for 1999 for all provinces in Sumatra were higher in rural than in urban areas, except in Bengkulu and Lampung. Having the SCOLI-B for 1999, the backcasting resulted in urban SCOLI-B higher than rural SCOLI-B as expected in 1996 (Table 6.2a). Continuing to backcast to the earlier Susenas years resulted in large gaps. Eventually, the U-R COL gap in 1987 was very large, 70 per cent, and even larger than the gap generated by ***P_urb_7*** and ***P_rur_68*** (Table A6.2a of Appendix 6.1). The gap was also higher than the one implied by the BPS poverty lines for 1987, which was 68 per cent (BPS 2003c). The largest U-R COL gaps in 1987 were for provinces in Java, among which the smallest gap was for Yogyakarta, 92 per cent (Table 6.2a). The largest gap was in West Java (120 per cent). It is of course not impossible for the U-R COL gap to be negative in some instances and very lage in others. However, it will be shown later (Table A6.1a) that the gap for West Java in 1987 implied by BPS's own disaggregated data by individual items is only 28.5 per cent. In addition, the average gap for all provinces in 1987 implied by the disaggregated data is only 7.5 per cent (Table A6.1a), rather than the 69.6 per cent average gap (Table 6.2a) implied by the aggregated price indexes. Because of these contradictions, the preferred backcasting method (i.e., Table 6.1) represents a compromise that avoids both negative U-R COL gaps and very large positive ones.

Table 6.2a: The U-R COL gaps of SCOLI-B

	Province	1987	1990	1993	1996	1999	2002
1	Aceh	18.9	17.6	28.1	14.4	-9.3	6.3
2	N Sumatra	19.2	16.5	29.3	14.5	-3.8	6.3
3	W Sumatra	30.3	14.5	26.2	12.6	-4.5	6.3
4	Riau	36.0	19.9	30.2	14.2	-8.5	6.3
5	Jambi	54.6	37.3	47.8	28.2	-0.6	6.8
6	S Sumatra	29.3	18.0	29.4	14.4	-2.5	6.8
7	Bengkulu	51.0	34.6	46.8	27.4	4.8	10.9
8	Lampung	28.0	25.4	37.0	21.5	1.1	10.9
9	Jakarta	-	-	-	-	-	-
10	W Java	119.9	92.5	103.9	80.2	28.8	15.2
11	C Java	112.1	85.5	98.0	68.8	16.1	4.6
12	Yogyakarta	91.9	69.7	80.2	58.5	19.6	4.6
13	E Java	108.9	89.3	104.4	82.3	34.0	19.1
14	Bali	39.7	39.7	59.3	34.1	6.8	19.1
15	W Nusa T	20.3	18.9	37.1	22.1	2.2	6.3
16	E Nusa T	41.3	31.0	43.4	22.9	-6.6	6.3
17	W Kalimantan	36.6	31.3	45.8	28.0	7.4	17.7
18	C Kalimantan	54.9	46.0	61.4	39.6	8.8	17.7
19	S Kalimantan	62.3	52.4	66.0	42.7	14.9	17.7
20	E Kalimantan	53.0	38.4	53.7	35.0	4.4	17.7
21	N Sulawesi	22.3	10.8	20.2	11.6	-7.4	6.5
22	C Sulawesi	23.7	9.2	16.9	4.3	-5.8	9.7
23	S Sulawesi	52.0	35.8	46.5	28.9	2.6	9.7
24	SE Sulawesi	21.2	8.6	27.8	12.4	0.0	9.7
25	Maluku	7.7	33.3	39.0	18.6	-0.9	6.5
26	Papua	31.7	29.0	36.7	21.7	-7.4	6.5
	INDONESIA	***69.6***	***57.8***	***71.9***	***51.7***	***14.5***	***13.3***

Notes: Minus signs in some U-R COL gaps for 1999 indicate urban SCOLI < rural SCOLI

Source: Recalculated from Table 6.2.

6.4. Comparisons between the two methods and searching for the causes of discrepancies

This sub-section explores the causes of the discrepancy between the SCOLI-A derived using the preferred method and the SCOLI-B derived using the alternative method.

Generally, the SCOLI-B for urban areas for earlier Susenas years is higher than the SCOLI-A. However, the SCOLI-B for rural areas is on average almost the same with the former. In 1987, for example, the urban SCOLI-B on average across provinces was estimated at 21.7 (Table 6.2), which is 51 per cent higher than SCOLI-A (i.e., 14.4, Table 6.1). For this reason, the U-R COL gap from the SCOLI-B was much larger in 1987 than from the SCOLI-A.

The discrepancy between SCOLI-A and SCOLI-B reflects the difference in the increase in ***P_urb_179*** and ***P_rur_68*** on the one hand and the ***urban BPS CPI*** and ***rural BPS CPI*** on the other hand. As can be seen from Table 6.3, the average inflation during the whole period from 1987 to 2002 based on ***P_urb_179*** (obtained by aggregating official data by item) was 15.0 per cent per year, roughly 3 percentage points higher than the one based on ***urban BPS CPI,*** 11.9 per cent. However, the average of inflation rate for rural areas based on ***P_rur_68,*** 14.8 per cent per year, was almost the same as the average inflation based on ***rural BPS CPI***, 14.6 per cent.

Table 6.3: Average inflation rates based on various CPIs (% per year)

CPI [a]	1987-90	1990-93	1993-96	1996-99	1999-02	All years (1987-02)
I. ***P_urb_179***	10.2	10.2	11.3	37.7	8.2	15.0
P_urb_7	7.7	8.1	9.0	32.2	6.9	12.4
P_rur_68	8.9	7.8	12.0	36.0	10.6	14.6
Provincial CPI	9.3	8.6	11.8	36.7	9.6	14.7
II. ***Urban BPS CPI*** [b]	7.4	8.9	8.6	26.5	9.0	11.9
Rural BPS CPI [c]	10.4	5.7	12.6	38.3	9.9	14.8

Notes:

a) All estimates are based on the national average. The following are explanations for selected indexes (see Sub-sections 6.2.3.1 for detailed explanation): ***P_urb_179***: urban CPI derived from price of 179 individual items and Susenas weights; ***P_urb_7***: urban CPI derived from 7 broad groups of CPI and Susenas weights as defined in Appendix 6.1; ***P_rur_68***: rural CPI derived from price of 68 individual items and Susenas weights; and ***Provincial CPI***: population weighted average of ***P_urb_179*** and ***P_rur_68.***

b) BPS publishes monthly estimates of ***urban BPS CPI*** for Indonesia. The monthly series is then annualized by simple average. The series reported in the table are the annual growth rate of the annual data.

c) The ***rural BPS CPI*** is based on a population weighted average of monthly BPS CPI series for rural Java and rural non- Java. The monthly series is also annualized by simple average. The rural series reported in the table are the annual growth rate of the annual data.

Source: Author's estimates, recalculated from BPS.

From the explanation in Sub-section 6.2.3.1, it can be concluded that two factors may drive the discrepancy between ***P_urb_179*** and ***P_rur_68*** on the one hand and the ***urban BPS CPI*** and ***rural BPS.*** First, the number of individual price data used to construct the CPIs was different. ***P_urb_179*** was derived from 179 published individual price data, while the ***urban BPS CPI*** was from more than 300 individual price data of which only slightly above 179 are published (in 2002). In contrast, ***P_rur_68*** was derived from 68 individual price data, while ***rural BPS CPI*** was from only 8 individual items. Second, ***P-urb_179*** and ***P_rur_68*** use Susenas-weights, but ***urban BPS CPI*** and ***rural BPS CPI*** use the BPS-weights derived from BPS cost of living survey in selected cities. The weights for foodstuffs items (in total) used in ***P_urb_179*** , which are identical with ***P_rur_68,*** are much higher than those in ***urban BPS CPI.*** The weights assigned to the foodstuffs group in ***P_urb_179*** in 1990, for example, was 67.7 per cent[7] and the corresponding weights in ***urban BPS CPI*** for a period including 1990 to 1993 was only 38.6 per cent (BPS 1990),[8] almost half of the former.

Table 6.4 shows ***P_urb_179, P_urb_7, P_rur_68*** and the official CPI for 1993 (1990=100) in urban and rural areas and the decomposition of each CPI in each area into its components: the weights and the individual price index components. It uses the following formula:

$$6.11 \qquad P-P'=(P^F-P^N)(\alpha-\alpha')+\alpha'(P^F-P'^F)+(1-\alpha')(P^N-P'^N)$$

where P is ***P_urb_179*** and ***P_urb_7*** if it is in urban area and ***P_rur_68*** if it is in rural

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[7] The weights assigned to each item in ***P_urb_179*** and ***P_rur_68*** varies over time based on the data for the relevant Susenas year. However, it can be said that the weights for food (i.e., food stuffs plus prepared food) is around 70 per cent. The weight reported in the main text is only from the foodstuffs group alone in 1990.

[8] During the fifteen years from 1987 to 2002, ***urban BPS CPI*** has used four base years: 1977/1978, 1988/1989, 1996, and the 2002 base year; meanwhile ***rural BPS CPI*** has used only 1971 base year for the last 35 years. The weight of 38.6 per cent in the main text was an expenditure weighted average across provincial capital cities based on BPS (1990, Attachment 5, p.30-31) when the base year was 1988/89. It excludes the prepared food group, as these were put in miscellaneous CPI groups.

areas; P^F and P^N is the food and non-food component of P; α is the food share used in P; and the prime denotes these variables' counterparts. The first term in the right hand side of equation 6.11 is the contribution of difference weights and the other terms are the contribution of individual food and non-food prices to the total difference among urban CPIs (***P_urb_179, P_urb_7*** and ***urban BPS CPI***) and between ***P_rur_68*** and ***rural BPS.***

As can be seen from Table 6.4, the discrepancy between the CPIs in each area was mainly from the differences in individual food and non-food prices. Even though the difference in Susenas-weights and BPS-weights relatively large, especially in urban area, the contribution of the difference in these weights in each area to the differences between the two CPI estimates was only a half of the contribution of the differences in individual food and non-food prices. This suggests that the difference in number of item included in the CPI calculation may contribute substantially to the differences between the two CPI estimates.

Table 6.4: Decomposition of the differences between the author's and the official CPI

Price index	Share (%)		CPI components 1993 (1990=100)		CPI 1993 (1990=100)	Excess of the author's CPI over the official CPI	Decomposition of the excess of the author's CPI over the official CPI into the contribution of:	
	Food	Non-food	Food price index	Non-food price index			Different weights	Different food and non-food prices
Urban areas								
P_urb_179	67.7	32.3	124.1 [c)]	153.7	133.7	0.0	0.0	0.0
P_urb_7	67.7	32.3	124.2 [d)]	130.9	126.4	7.3	0.0	7.3
urban BPS CPI	38.6 [a)]	61.4	124.2 [d)]	130.3	127.9	5.8	-8.6	14.4
Rural areas								
P_rur_68	67.7	32.3	121.6 [c)]	133.0	125.3	0.0	0.0	0.0
rural BPS CPI	86.7 [b)]	13.3	114.8 [c)]	136.7	117.7	7.6	2.2	5.4

Notes: "author's CPI" refers to the three series derived by the author from BPS data on individual items (***P_urb_179*** and ***P_rur_68***) and groups of items (***P_urb_7***).

a) An expenditure weighted average across provincial capital cities based on BPS (1990, Attachment 5, p.30-31).

b) The author estimates (see Table A6.4 of Appendix 6.3).

c) Estimated using equation A6.2 of Appendix 6.1 applied to g = food items and non-food items and $t = 1993$ ($1990 = 100$).

d) It is estimated using: $\frac{\tilde{P}(F,j,t)}{\tilde{P}(F,j,t-3)} = \frac{\sum_{g \in F} \tilde{s}^j(g,t-3)\frac{p'(g,j,t)}{p'(g,j,t-3)}}{\tilde{s}^j(g,t-3)}$, where g is CPI components under food categories, F; the share used in each CPI is as indicated under the column heading 'share (%)'.

e) For urban area, it is the excess of ***P_urb_179*** over other indices. For rural, it is ***P_rur_68*** minus Rural BPS CPI

Source: As in the notes.

6.5. Summary and conclusions

Two sets of SCOLI were estimated for each region for each Susenas year (1987, 1990, ..., 2002). They are referred to as SCOLI-A and SCOLI-B. SCOLI-A was derived using ***provincial CPI***, which is population weighted average of ***P_urb_179*** and ***P_urb_68***. SCOLI-B was derived using the official CPI: ***urban BPS CPI*** and ***rural BPS CPI***. Both SCOLIs were set on rural Indonesia 2002 = 100 and, by construction, both are identical for all regions in 2002. The results are as follows. Starting with SCOLI for 2002 for urban and rural Indonesia of 113.3 and 100, respectively, the SCOLI-A for 1987 on average was estimated at the level of 14.4 and 12.9 for the urban and rural areas, respectively. In contrast, SCOLI-B for 1987 on average was estimated at the level of 21.7 for urban, 51 per cent higher than the former; and 12.8 for rural areas, which was almost the same with the former.

The discrepancy between the two sets of SCOLI was due to the differences in the inflation estimates between ***P_urb_179*** and ***urban BPS CPI***. The inflation rates using ***P_urb_179*** were much higher than using ***urban BPS CPI*** during the 15 years from 1987 to 2002, i.e., 15 per cent compared to 11.9 per cent per year. Part of the discrepancy was due to the difference in the weights used. ***P_urb_179*** used Susenas-weights and ***urban BPS CPI*** used BPS-weights. The weight for foodstuffs items in the ***P_urb_179*** was much higher than in ***urban BPS CPI***. For example, the weight assigned to the foodstuffs group in ***P_urb_179*** in 1990 was 67.7 per cent and in ***urban BPS CPI*** was only 38.6 per cent, almost half of the former. With the large weights for food, the inflation estimates in every Susenas year tend to follow the patterns of the inflation rate for foodstuffs. However, there are also large differences between the inflation rates for food prices in the disaggregated data used in SCOLI-A and the aggregated data used in SCOLI-B. These differences may be due to different weights on individual food items, or to the effect of items included in the aggregated official series, but not separately published – and therefore necessarily excluded – from the disaggregated data used to construct SCOLI-A. In the absence of published data on all items included in the BPS CPI series, it is impossible to account fully for the discrepancies between the aggregated and disaggregated official data. Obviously the results must be interpreted with caution and only results that are robust to switching between SCOLI-A and SCOLI-B can be taken as firm.

Appendix 6.1: The reasons for the compromise approach

This appendix explores the reasons for taking the compromise approach. It explores the paradoxical problems arising when the backcasting used ***P_urb_179*** and ***P_rur_68***, and explores the implausibly large U-R COL gap problem when the backcasting was using ***P_urb_7*** and ***P_rur_68***.

Ideally, the change in SCOLI over time for urban (rural) area is determined by the change in CPI in the urban (rural). The backcasting for *rural* East Java, for example, should use the CPI for *rural* East Java, and the backcasting for *urban* East Java should use the CPI for *urban* East Java, and so on. The backcasting in this way does not impose a constant U-R COL gap over time in each province. Accordingly, the ideal formula for backcasting is:

A6.1 $$\frac{\widetilde{P}(j,t)}{\widetilde{P}(j,t-3)} = \sum_{i=1}^{N} s^{j}(i,t-3)\frac{p'(i,j,t)}{p'(i,j,t-3)}, \text{ for } j = 1, 2, \ldots, 51$$

All variables and notation were defined in equations 6.1a, 6.1b, 6.2a, and 6.2b. Also, $s^{j}(i,t-3)$ is as defined in equation 6.3 in the main text. The right hand side (RHS) of equation A6.1 is the change in ***P_urb_179*** if j is an urban area and the change in ***P_rur_68*** if j is a rural area.

In addition to reported by individual item, that is, "i" in the notation above, the price data are also reported by broad groups of items but for urban areas only. The different levels of aggregation would not be a problem if the aggregation was done consistently in the sense that:

$$\text{A6.2} \quad \frac{\tilde{p}'(g,j,t)}{\tilde{p}'(g,j,t-3)} = \frac{\sum s^j(i,t-3)\dfrac{p'(i,j,t)}{p'(i,j,t-3)}}{\sum s^j(i,t-3)}$$

where $\tilde{p}'(g,j,t)$ is the price index for group g (for examples, food stuffs; prepared food, beverages, and tobacco products; housing; and so forth) in region j in year t and the summations in both the numerator and denominator of equation A6.2 are for all items in group g.

If the weight for group g is denoted $\tilde{s}^j(g,t)$ and defined by:

$$\text{A6.3} \qquad \tilde{s}^j(g,t-3) = \sum_i s^j(i,t-3)$$

It is obvious an equation exactly analogous to A6.1 holds for the aggregated data:

$$\text{A6.4} \quad \frac{\tilde{P}(j,t)}{\tilde{P}(j,t-3)} = \sum_{g=1}^{G} \tilde{s}^j(g,t-3)\frac{p'(g,j,t)}{p'(g,j,t-3)}, \text{ for } j \in U.$$

where G is the total number of groups.

Accordingly, the ideal formulas for backcasting could use equations A6.1 or A6.4. However, as will be explained below, the two equations result in inconsistent estimates of SCOLI.

Data needed to estimate equation A6.1 are the ones to estimate equation 6.2a and 6.2b in Section 6.2 and data for equation A6.4 (which is applied for urban areas only) are:

- ***BPS CPI 7 groups in urban areas of each province***: these data are indices, based on 100 in some specified year. From 1990 onward, the following 7 groups (***BPS CPI 7 groups***) were distinguished: food stuffs; prepared food, beverages, and tobacco products; housing; clothing; health; education, recreation, and sports; and transportation and telecommunications. Before 1990, only four groups were distinguished: foodstuffs; housing; clothing; and miscellaneous. These indices have been derived by BPS (rather than the author) and are the aggregation of the individual prices of more than 300 items (BPS 2003a). The CPI derived by the author from the ***BPS CPI 7 groups*** is ***P_urb_7***, which is obtained by applying equation A6.4 in each province using Susenas-weights and the ***BPS CPI 7 groups*** for provincial capital cities. Setting $\widetilde{P}(j,2002)$ at the values given in Table 4.10 of Chapter 4, this yields estimates for $\widetilde{P}(j,t)$ for urban areas for t = 1987, 1990, … , 1999.

Two CPIs for urban areas: ***P_urb_179*** (based on equation A6.1) and ***P_urb_7*** (based on equation A6.4), and one CPI for rural areas: ***P_rur_68*** (based on equation A6.1) could be used for backcasting. Accordingly, the backcasting could use two pairs of price indices, separately. First pair was ***P_urb_179*** and ***P_rur_68***; and the second one was ***P_urb_7*** and ***P_rur_68***.

Firstly, the author calculated the urban SCOLI using ***P_urb179*** and calculated the rural SCOLI using ***P_rur_68*** by applying equation A6.1. The results are reported in Table A6.1. Some urban SCOLI for 1999 were lower than rural SCOLI, i.e., in three provinces– South Kalimantan, Central Sulawesi, and Maluku. The urban and rural

SCOLI for South Kalimantan was estimated at 63.9 and 76.0, respectively. Likewise, urban and rural SCOLI in Central Sulawesi were estimated at 72.6 and 76.2; and in Maluku at 105.5 and 106.2. This is a paradoxical problem in discussion.

To show the depth of the problem, the U-R COL gap in each province and each year are generated and shown in Table A6.1a. The minus sign in a number of cells indicates urban SCOLI is lower than rural SCOLI. Backcasting further from SCOLI 1999 to SCOLI 1996 increases the number of paradoxical cases. Further backcasting from one Susenas year to another Susenas year until 1987 exacerbates the problems. In 1987, more than half the provinces had urban SCOLI lower than rural SCOLI. As each SCOLI reflects a poverty line, the results imply urban poverty lines were lower than rural poverty lines in these provinces. This is paradoxical because common sense suggests urban poverty lines should be higher than rural poverty lines. All poverty lines estimates done for Indonesia support this point. For example, Sajogyo and Wiradi (1985), Esmara (1986), Bidani and Ravallion (1993), and BPS (2003c) just to mention a few.

Table A6.1: SCOLI 1987 – 2002 derived using ***P_urb_179*** and ***P_rur_68*** (Rural areas 2002 = 100)

	Province	1987		1990		1993		1996		1999		2002	
		Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
1	Aceh	13.5)*	13.2	18.0	16.2	22.6	18.7	30.5	27.2	77.5	71.3	107.7	101.3
2	N Sumatra	12.1	13.2	16.4	15.9	21.9	20.1	28.6	29.5	79.5	73.4	109.4	102.9
3	W Sumatra	13.1	14.8	16.6	18.1	21.1	21.1	30.3	29.5	80.6	74.1	104.8	98.6
4	Riau	14.2	16.1	18.0	19.4	23.0	24.5	32.8	36.1	81.9	73.5	107.9	101.5
5	Jambi	14.2	13.5	18.5	16.1	23.7	20.6	30.8	26.6	77.8	68.3	98.6	92.3
6	S Sumatra	12.7	15.5	16.1	18.6	21.4	23.8	29.1	30.7	85.1	70.2	109.7	102.6
7	Bengkulu	14.2	14.4	18.9	18.6	23.1	22.2	31.0	32.4	86.2	71.2	106.7	96.2
8	Lampung	12.6	12.8	16.2	16.6	22.0	19.8	30.2	28.8	80.8	65.0	105.5	95.1
9	Jakarta	15.2	-	20.7	-	28.0	-	40.4	-	103.3	-	131.9	-
10	W Java	16.0	12.5	21.9	16.9	29.0	21.6	40.8	30.4	97.2	81.0	117.2	101.7
11	C Java	11.7	12.7	15.7	16.4	21.0	20.4	29.2	28.9	77.5	72.1	101.1	96.7
12	Yogyakarta	12.7	12.3	16.3	15.7	22.0	19.5	30.5	27.6	81.7	68.5	101.3	96.9
13	E Java	13.1	10.8	17.7	14.4	24.2	18.0	32.0	26.3	89.5	69.2	111.0	93.2
14	Bali	15.4	13.6	19.9	17.8	27.1	22.7	36.9	29.9	97.6	77.2	128.4	107.8
15	W Nusa T	12.2	12.0	16.8	14.7	20.7	18.7	28.6	25.3	84.4	69.4	104.5	98.3
16	E Nusa T	13.7	17.2	16.5	21.0	22.4	26.7	33.5	36.1	85.0	78.9	122.5	115.3
17	W Kalimantan	14.8	16.5	19.7	20.4	25.8	25.2	34.9	33.7	93.9	65.9	111.3	94.6
18	C Kalimantan	18.3	22.6	24.8	28.0	30.8	34.7	45.2	46.3	114.3	91.9	144.6	122.9
19	S Kalimantan	10.3	15.6	13.2	19.4	17.0	24.0	23.4	32.1	63.9	76.0	109.1	92.7
20	E Kalimantan	16.9	16.9	22.5	20.9	30.2	25.9	39.2	34.6	100.7	70.9	122.6	104.2
21	N Sulawesi	12.9	16.3	17.4	19.3	24.0	24.0	32.7	31.2	92.8	89.7	118.8	111.5
22	C Sulawesi	11.7	13.9	14.0	18.6	19.5	23.9	26.5	33.0	72.6	76.2	111.2	101.3
23	S Sulawesi	14.8	11.3	18.5	15.2	25.2	19.5	32.4	26.9	89.3	69.4	107.8	98.2
24	SE Sulawesi	14.9	12.7	19.5	17.1	26.5	22.0	35.0	30.3	94.5	77.7	116.9	106.6
25	Maluku	17.4	19.3	23.5	22.8	29.0	28.4	40.8	36.9	105.5	106.2	140.6	132.0
26	Papua	18.5	17.8	23.3	21.0	29.1	26.1	39.6	34.0	101.8	97.8	129.6	121.6
	INDONESIA)[a]	***14.0***	***13.0***	***18.8***	***16.8***	***25.1***	***21.0***	***34.7***	***29.6***	***90.0***	***74.1***	***113.3***	***100.0***

Notes:

a) Population weighted average.

Source: Author's estimates

Table A6.1a: The U-R COL gap derived using ***P_urb_179*** and ***P_rur_68***

	Province	1987	1990	1993	1996	1999	2002
1	Aceh	1.8	11.7	20.7	12.2	8.7	6.3
2	N Sumatra	-7.7	3.1	9.3	-3.0	8.3	6.3
3	W Sumatra	-11.1	-8.0	0.2	2.7	8.7	6.3
4	Riau	-11.4	-7.3	-6.3	-9.0	11.3	6.3
5	Jambi	5.7	14.8	14.9	15.4	14.0	6.8
6	S Sumatra	-18.1	-13.3	-10.0	-5.2	21.2	6.8
7	Bengkulu	-1.4	1.1	4.1	-4.5	21.0	10.9
8	Lampung	-1.8	-2.1	11.3	4.7	24.3	10.9
9	Jakarta	-	-	-	-	-	-
10	W Java	28.5	29.2	34.6	34.1	19.9	15.2
11	C Java	-7.4	-3.9	2.8	1.3	7.6	4.6
12	Yogyakarta	3.1	3.3	13.0	10.5	19.3	4.6
13	E Java	21.8	23.5	34.6	21.9	29.4	19.1
14	Bali	13.4	11.8	19.4	23.5	26.4	19.1
15	W Nusa T	1.1	14.1	10.9	13.1	21.6	6.3
16	E Nusa T	-20.5	-21.4	-16.1	-7.2	7.8	6.3
17	W Kalimantan	-10.3	-3.3	2.4	3.4	42.4	17.7
18	C Kalimantan	-19.2	-11.2	-11.0	-2.5	24.4	17.7
19	S Kalimantan	-34.0	-31.9	-29.1	-27.1	-15.8	17.7
20	E Kalimantan	0.0	7.8	16.6	13.3	42.1	17.7
21	N Sulawesi	-20.8	-9.8	0.1	4.8	3.4	6.5
22	C Sulawesi	-15.9	-24.7	-18.5	-19.5	-4.8	9.7
23	S Sulawesi	30.3	21.7	29.3	20.3	28.8	9.7
24	SE Sulawesi	16.6	14.3	20.5	15.4	21.7	9.7
25	Maluku	-10.2	2.9	2.4	10.6	-0.7	6.5
26	Papua	3.9	11.0	11.2	16.4	4.0	6.5
	INDONESIA	***7.5***	***11.9***	***19.3***	***17.4***	***21.5***	***13.3***

Notes: Minus signs in some U-R COL gaps for some years indicate urban SCOLI < rural SCOLI

Source: Recalculated from Table A6.1

Secondly, the opposite problem arose when ***P_urb_7*** was used for backcasting urban SCOLI, while still using ***P_rur_68*** for rural areas. The backcasting results were indeed as expected. Urban SCOLI was higher than rural SCOLI in all provinces, except in one case, i.e., SCOLI 1999 in North Sulawesi (Table A6.2). The U-R COL gaps are reported in Table A6.2a (cell with the minus sign indicates the exception just mentioned). However, on average across provinces, the gap appears implausibly large. Starting from a U-R COL gap of 13 per cent in 2002, the backcasting results show that urban SCOLI for 1987 was 52 per cent higher than rural SCOLI, which is much larger than the gap in 2002. By the standard of other studies on 'consistent' poverty lines in Indonesia (Bidani and Ravallion 1993; Ravallion and Bidani 1994; Pradhan et al. 2000; Suryahadi et al. 2000; BPS 2003c)[9] and by the standard of urban to rural cost of living differences (Ravallion and van de Walle 1991; Asra 1999), this 52 per cent U-R COL gap appears excessive.

[9] Recall that for a given year, these studies use a nationally fixed bundle for estimating food poverty lines, whereas the BPS method uses a variable bundle.

Table A6.2: SCOLI 1987 – 2002 derived using ***P_urb_7*** and ***P_rur_68*** (Rural areas 2002 = 100)

	Province	1987		1990		1993		1996		1999		2002	
		Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
1	Aceh	16.8	13.2	21.9	16.2	26.6	18.7	35.4	27.2	80.1	71.3	107.7	101.3
2	N Sumatra	16.5	13.2	21.4	15.9	26.5	20.1	34.7	29.5	85.9	73.4	109.4	102.9
3	W Sumatra	17.5	14.8	20.7	18.1	25.9	21.1	33.3	29.5	84.2	74.1	104.8	98.6
4	Riau	17.2	16.1	22.7	19.4	28.1	24.5	36.4	36.1	83.3	73.5	107.9	101.5
5	Jambi	19.8	13.5	23.4	16.1	28.4	20.6	35.9	26.6	81.4	68.3	98.6	92.3
6	S Sumatra	19.1	15.5	22.4	18.6	27.5	23.8	35.8	30.7	89.9	70.2	109.7	102.6
7	Bengkulu	21.0	14.4	24.4	18.6	29.8	22.2	38.6	32.4	91.1	71.2	106.7	96.2
8	Lampung	18.1	12.8	22.4	16.6	27.8	19.8	36.6	28.8	85.6	65.0	105.5	95.1
9	Jakarta	21.4	-	26.4	-	34.3	-	47.6	-	109.3	-	131.9	-
10	W Java	22.3	12.5	27.2	16.9	34.1	21.6	43.0	30.4	96.9	81.0	117.2	101.7
11	C Java	17.4	12.7	22.1	16.4	28.7	20.4	35.7	28.9	82.1	72.1	101.1	96.7
12	Yogyakarta	17.6	12.3	22.7	15.7	28.5	19.5	37.4	27.6	85.7	68.5	101.3	96.9
13	E Java	19.6	10.8	24.8	14.4	31.5	18.0	41.0	26.3	91.9	69.2	111.0	93.2
14	Bali	18.9	13.6	27.1	17.8	35.6	22.7	43.3	29.9	103.4	77.2	128.4	107.8
15	W Nusa T	16.4	12.0	22.0	14.7	27.0	18.7	35.5	25.3	90.0	69.4	104.5	98.3
16	E Nusa T	23.3	17.2	28.2	21.0	35.0	26.7	43.7	36.1	96.1	78.9	122.5	115.3
17	W Kalimantan	19.2	16.5	24.6	20.4	30.7	25.2	38.8	33.7	90.0	65.9	111.3	94.6
18	C Kalimantan	26.4	22.6	33.5	28.0	42.1	34.7	53.9	46.3	118.5	91.9	144.6	122.9
19	S Kalimantan	20.9	15.6	25.4	19.4	31.4	24.0	39.2	32.1	94.6	76.0	109.1	92.7
20	E Kalimantan	21.7	16.9	26.8	20.9	33.8	25.9	44.0	34.6	96.3	70.9	122.6	104.2
21	N Sulawesi	17.3	16.3	20.5	19.3	25.2	24.0	36.1	31.2	89.0	89.7	118.8	111.5
22	C Sulawesi	17.8	13.9	22.5	18.6	26.8	23.9	35.7	33.0	94.1	76.2	111.2	101.3
23	S Sulawesi	21.3	11.3	25.6	15.2	30.8	19.5	39.8	26.9	92.4	69.4	107.8	98.2
24	SE Sulawesi	18.2	12.7	22.6	17.1	30.5	22.0	37.2	30.3	94.5	77.7	116.9	106.6
25	Maluku	19.8	19.3	28.3	22.8	33.4	28.4	40.9	36.9	113.3	106.2	140.6	132.0
26	Papua	23.3	17.8	29.1	21.0	35.1	26.1	46.7	34.0	99.5	97.8	129.6	121.6
	INDONESIA)[a]	***19.8***	***13.0***	***24.8***	***16.8***	***31.3***	***21.0***	***40.6***	***29.6***	***93.3***	***74.1***	***113.3***	***100.0***

Notes:

a) Population weighted average

Source: Author's estimates

Table A6.2a: The U-R COL gap derived using ***P_urb_7*** and ***P_rur_68***

	Province	1987	1990	1993	1996	1999	2002
1	Aceh	26.8	35.6	41.9	30.0	12.5	6.3
2	N Sumatra	25.5	35.0	32.1	17.6	17.0	6.3
3	W Sumatra	18.2	14.4	22.6	13.1	13.5	6.3
4	Riau	7.0	17.2	14.4	0.9	13.3	6.3
5	Jambi	47.1	45.5	37.3	34.6	19.2	6.8
6	S Sumatra	23.0	20.6	15.3	16.7	28.0	6.8
7	Bengkulu	46.1	31.1	34.0	19.2	27.8	10.9
8	Lampung	41.6	35.3	40.7	26.9	31.7	10.9
9	Jakarta	-	-	-	-	-	-
10	W Java	78.9	60.9	58.3	41.3	19.6	15.2
11	C Java	37.0	34.7	40.4	23.6	13.9	4.6
12	Yogyakarta	43.3	44.0	46.7	35.6	25.0	4.6
13	E Java	81.9	72.5	74.8	56.3	32.9	19.1
14	Bali	38.8	52.3	57.3	44.7	33.9	19.1
15	W Nusa T	36.1	49.4	44.5	40.1	29.6	6.3
16	E Nusa T	36.0	34.0	31.2	20.9	21.9	6.3
17	W Kalimantan	16.5	20.7	21.9	15.0	36.4	17.7
18	C Kalimantan	16.9	19.9	21.6	16.3	29.0	17.7
19	S Kalimantan	33.5	31.0	30.9	22.4	24.6	17.7
20	E Kalimantan	28.9	28.6	30.6	27.3	35.8	17.7
21	N Sulawesi	5.6	6.3	5.3	15.6	-0.8	6.5
22	C Sulawesi	28.1	21.1	12.4	8.3	23.4	9.7
23	S Sulawesi	88.2	68.5	58.0	47.8	33.2	9.7
24	SE Sulawesi	42.7	32.3	38.9	22.8	21.7	9.7
25	Maluku	2.4	24.2	17.8	10.7	6.7	6.5
26	Papua	30.7	38.5	34.2	37.3	1.7	6.5
	INDONESIA	***52.5***	***47.8***	***48.9***	***37.2***	***25.8***	***13.3***

Notes: An U-R COL gap for 1999 with minus sign indicates urban SCOLI < rural SCOLI. It occurred only in 1999 for North Sulawesi.

Source: Recalculated from Table A6.2

The backcasting for urban and rural SCOLI should theoretically use ***P_urb_179*** and ***P_rur_68*** respectively. The use of ***P_urb_179*** for backcasting urban SCOLI is better than ***P_urb_7***. The Susenas-weights capture the inflation experienced by low-income households better than the BPS-weights, which measure the inflation experienced by an average of all households. Recall that the weights used to estimate ***P_urb_179*** are derived from consumption patterns of the households deemed to be poor in the Susenas data. In contrast, ***P_urb_7*** partly uses BPS-weights. This is because ***P_urb_7*** was derived by the author based on the **BPS CPI 7 group**, which is the aggregation of individual price and the aggregation was using BPS-weights. However, the use ***P_urb_179*** and ***P_rur_68*** for backcasting generate a crossover problem with rural SCOLI being sometimes higher than urban SCOLI. So, on the one hand, the use of ***P_urb_179*** and ***P_rur_68*** for backcasting results in paradoxical problems, on the other hand, the use of ***P_urb_7*** and ***P_rur_68*** generates an implausibly large gap of urban over rural SCOLI.

The conclusion that can be drawn from the discrepant results of the backcasting is that the urban and the rural SCOLI for each province in each Susenas year cannot be derived simultaneously from urban and rural CPI. ***P_urb_179*** cannot be used to backcast urban SCOLI, meanwhile ***P_rur_68*** is used to backcast rural SCOLI. As a result, the use the ***provincial CPI*** is probably the best approach to be used to backcast SCOLI.

Appendix 6.2: Provinces with no rural price data

Table A6.3: Provinces with have no rural prices data and their neighbouring provinces

Provinces with no rural prices data	Years for which no price data	The neighbouring provinces
(1)	(2)	(3)
Riau	1996 and before	North Sumatra
Jambi	1996 and before	South Sumatra
Bengkulu	1996 and before	Lampung
E Nusa Tenggara	1996 and before	W Nusa Tenggara
W Kalimantan C Kalimantan E Kalimantan	1996 and before	S Kalimantan
Maluku Papua	All years	N Sulawesi
C Sulawesi S E Sulawesi	1996 and before	S Sulawesi

Notes: The inflation rates in rural areas of provinces in Column (1) for selected years as indicated in Column (2) are assumed to be the same as the inflation rates in rural areas of provinces in Column (3).

Appendix 6.3: Estimating weights used in ***urban BPS CPI*** and ***rural BPS CPI*** (1996 base year)

As explained in Section 6.2.3.1, ***rural BPS CPI*** has been reported for only Java and non-Java and has been on a monthly basis. The approach taken to estimate weights used in rural CPI is a regression of the time series of rural Java CPI. The weight assigned for each commodity for rural Java CPI assigned by the BPS could be different from that assigned for rural non-Java. However, for simplicity, the estimation will be carried out only for Java and estimated coefficients will be assumed to be identical with non-Java.

The estimated weights for ***rural BPS CPI*** reported in Table 6.4 of this chapter are based on the estimated coefficients of equation:

A6.5 $\Delta P_t' = \phi_i \sum_i \Delta P'_{i,t} + \Delta \varepsilon_t$;

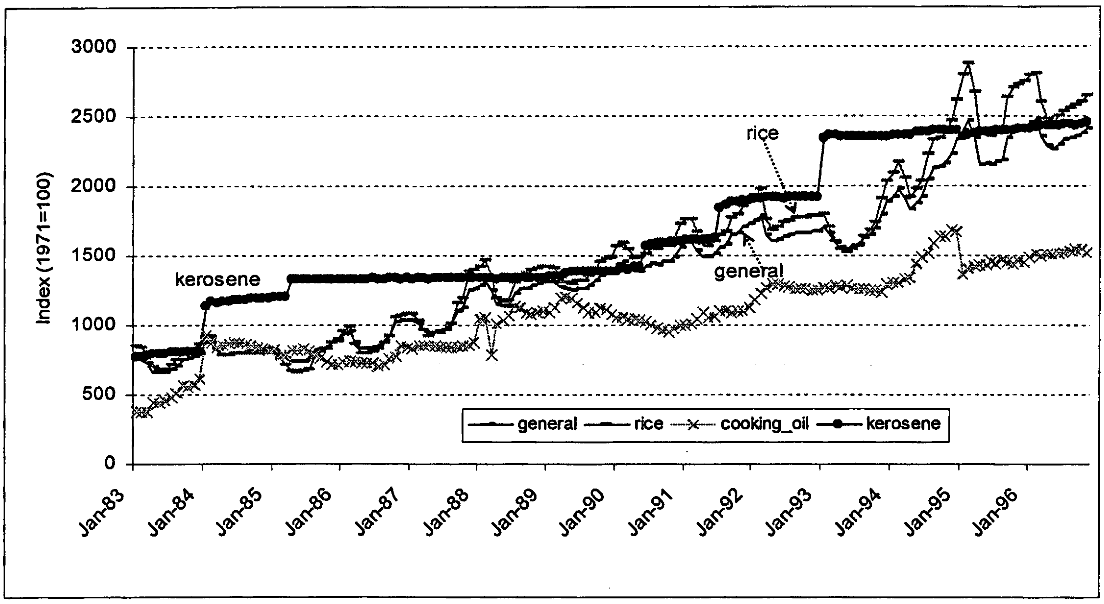
where ϕ_i is the estimated coefficient, P_t' is rural BPS CPI for Java at time t = January 1993 – November 1996 reported by the BPS; $P'_{i,t}$ is the rural commodity price index of commodity i (= 8 commodities, including kerosene price) at Java; and ε_t is the error term. Δ is a difference operator symbol. So, the regression uses difference of CPI rather than level of CPI to avoid the effect of time trend on the estimated coefficients. The time period is chosen for two reasons. First, within that period, there was no kerosene price change. Second, within that period, the regression results are positive for all the estimated coefficients.

Two apparent features are visible from the data set (see Figure A6.1). First, the ***rural***

BPS CPI is very closely related to the rice price. The fluctuation of the index over the period is very similar to the fluctuation of the rice price index. This suggests the weight for rice has been very high. Second, during the long period of time, the kerosene price shifts-up several times as a result of oil price adjustments by the government. This suggests, if the estimation uses data from the whole time period, it should consider the shifts in the data. Using data from the period where the kerosene price did not shift-up is an alternative. The estimation used here is the latter alternative.

For more than 35 years right up to the present time, ***rural BPS CPI*** has used the same base year, i.e., 1971 = 100. Therefore, given this long time series data, the estimation can be run using any ranges of time and the estimated ϕ_i should still be identical over these chosen ranges for each *i* regardless of the ranges of time periods used from 1971 onward. Another expected result is that, as indicated by the figure, the coefficient for rice is expected to be very high compared to other estimated coefficients.

Figure A6.1: The ***rural BPS CPI*** and its selected components (January 1983-December 1996)



Source: CEIC Asia database

The results of the regression are shown in Table A6.4. The restriction on estimated coefficients of CPI components to sum to unity cannot be rejected even at the 10 per cent level of significance. Thus, both models basically give the same weights for each rural CPI component. All food components (except salt - which is not significant) are significant at the 1% level. In contrast, all non-food components (except kerosene - which is highly significant at the 1% level) are not significant. As expected, these results show weight for rice is very high, i.e., 64 per cent. Adding all foodstuffs (four commodities) in rural CPI, the estimated coefficients make up 86.7 per cent of the total weights (based on the restriction model).

The fitted value of the ***rural BPS CPI*** for Java and non-Java using these estimated weights are shown in the Table A6.5. The estimated ***rural BPS CPI*** for Java in 1993 was almost the same as the actual official estimates and for non-Java was only 1% higher.

Table A6.4: Estimated weights for rural BPS-CPI based on the regression model

Components	Without restriction	With restriction
Δ Rice	0.637 (394.98)**	0.637 (395.32)**
Δ Salted fish	0.097 (12.68)**	0.10 (15.24)**
Δ Cooking oil	0.074 (16.65)**	0.072 (17.07)**
Δ Salt	0.086 (1.99)	0.058 (1.66)
Δ Kerosene	0.063 (21.02)**	0.063 (21.09)**
Δ Soap	0.054 (1.24)	0.026 (0.74)
Δ Textile	0.015 (0.58)	0.026 (1.11)
Δ Batik	0.024 (1.1)	0.017 (0.8)
Observations	47	47
R-squared	0.99	
	F(1,38)=1.20 Prob > F = 0.28	
Absolute value of t statistics in parentheses * significant at 5%; ** significant at 1%		

Source: Author's estimates

Table A6.5: Fitted value of ***rural BPS CPI*** for Java and non-Java in 1993 (1990=100)

Rural CPI components	Estimated Weights	Java		Non-Java	
		Actual rural BPS CPI	Fitted rural BPS CPI	Actual rural BPS CPI	Fitted rural BPS CPI
(1)	(2)	(3)	(4)=(2)*(3)	(5)	(6)=(2)*(5)
Rice	0.637	108.1	68.9	116.7	74.3
Salted fish: teri	0.100	121.4	12.1	128.3	12.8
Cooking oil	0.072	125.3	9.0	126.8	9.1
Salt	0.058	109.5	6.3	121.9	7.1
Kerosene	0.063	155.6	9.8	147.1	9.3
Soap	0.026	114.4	3.0	113.1	2.9
Textile	0.026	133.6	3.5	142.9	3.7
Batik	0.017	122.0	2.1	122.4	2.1
Rural BPS CPI		***114.6***	***114.7***	***120.8***	***121.3***

*) Based on Model with restriction in Table A6.4

Source: Author's estimates

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Chapter 7

The Poverty Incidence in Indonesia 1987-2002: A Re-examination

7.1. Introduction

The objective of this chapter is to analyse poverty trends, i.e., the *direction* and *magnitude* of the change in poverty and also to analyse the distribution of poverty across urban-rural areas, islands, and provinces. In accordance with the dominance theory (Section 2.5, Chapter 2), the cumulative distribution of real per capita expenditure is used to give *the direction* in the trend in poverty over time. This is followed by applying two poverty lines to estimate *the magnitude* of the change. Accordingly, the magnitude of poverty is measured primarily by poverty incidence (i.e., head count index, or HCI, defined as the percentage of population living below the poverty line), although other dimensions of poverty (depth and severity) are also reported. The two poverty lines are an acute and a mild poverty line. The acute poverty line is set so that the estimated HCI in 2002 is equal to the official (BPS) HCI, i.e., 17.6 per cent.[1] In doing so, the acute

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[1] This number is the author's estimate and is based on the national HCI for 2002 reported by BPS (i.e., 18.2 per cent). The estimate of 17.6 per cent excludes three provinces: Aceh, Maluku, and Papua (AMP), since Susenas 2002 was not carried out in these three provinces. BPS indeed reports the HCI for 2002 for AMP by making some assumptions on welfare distribution in each of the three provinces. For example, the welfare distribution in Aceh for 2002 was assumed to be the same as for 1999 (see technical notes on poverty in BPS 2004, p.581). This assumption seems too strong and is therefore inconsistent with the welfare distribution in other provinces. For consistency and for the purpose of setting the poverty line in

poverty line for Indonesian rural areas is set at Rp 101.9 thousand, which is equivalent to US $10.95 per capita per month or US $ 0.36 per day.[2] The mild poverty line is set at a level of 1.5 times the acute poverty line.

This chapter consists of 7 sections organised as follows. Analysis of the long-term trend of poverty incidence based on cumulative distribution of real per capita expenditure is reported in Section 7.2. This is followed by the long-term and short-term trends based on the acute and mild poverty lines in Section 7.3. The trends based on other poverty indices are reported in Section 7.4. Section 7.5 focuses on relative poverty being a misleading indicator for monitoring poverty. Variations in poverty incidence across various defined areas (urban-rural, across islands, across provinces) are reported in Section 7.6. The summary and conclusions are in the last section.

7.2. Trends in poverty: evidence from the cumulative distribution of per capita expenditure

This section reports the trend in poverty from 1987 to 2002 using the cumulative distribution (CD) of real per capita expenditure. CD is useful as information on the *direction* of the trend (change) in poverty rather than the *magnitude* of the change in poverty without setting any poverty lines and choosing poverty indices, as discussed in

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this study, the poverty incidences in AMP are excluded. Therefore, the time trend analysis of the national HCI will also exclude these provinces. However, the national HCI including AMP are also reported (Table A7.1 of Appendix 7.1).

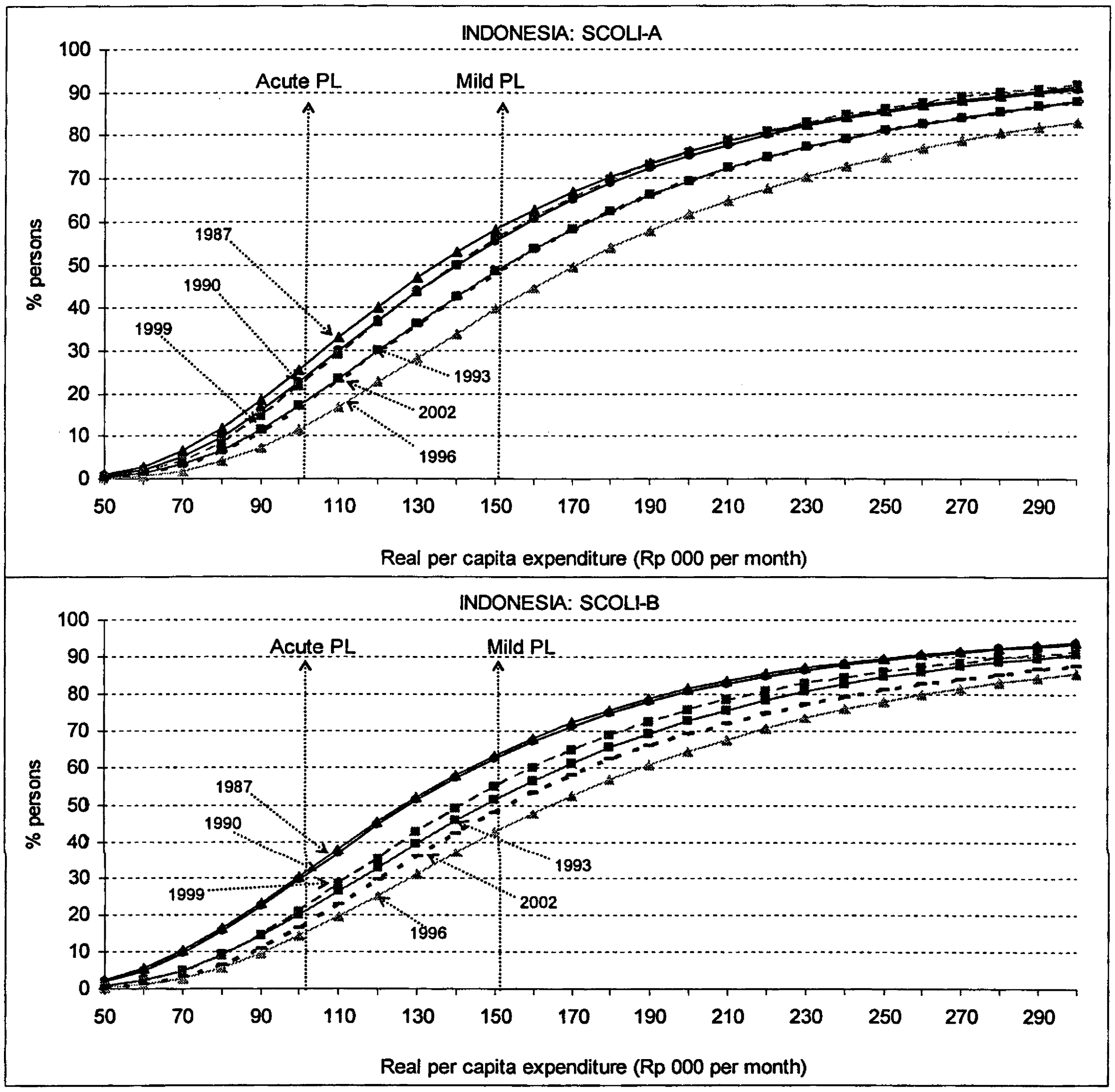
[2] Based on Table IDN.08 of The World Bank World Tables, the average exchange rate of Rupiah/US$ in 2002 was US$1= Rp 9,311.19

Section 2.5 of Chapter 2. This section reports two CDs of real per capita expenditure. They are the CD of real per capita expenditure derived using the preferred spatial cost of living index (SCOLI-A) and one derived using the alternative index, SCOLI-B (Tables 6.1 and 6.2 of Chapter 6) and are reported in Figure 7.1 (top and bottom parts).

As reported in Figure 1.1 of Chapter 1, the official poverty incidence for 1996 was revised to a level slightly higher than the poverty incidence for 1987 and the official poverty incidence for 2002 was roughly at the level of the revised 1996 estimate and therefore slightly *higher* than 1987.

Because the official BPS methodology for measuring poverty lines changed several times, and because the non-official studies do not apply an unchanging methodology to all years in the period 1987-2002, it has not previously been possible to have reliable estimates of the extent of the long-term decline in Indonesian poverty. Indeed, it required a certain amount of faith to conclude that the declines in poverty implied by the official estimates were genuine, and not merely the result of changing methodology. Of course, given the magnitude of Indonesia's real per capita growth over the period 1987-2002, it would have been surprising if poverty had not declined. This study provides consistent measures of the extent of the decline in poverty over this 15 year period and confirms the declines in poverty incidence have indeed been substantial. The incidence of both acute and mild poverty during the 15 years from 1987 to 2002 has definitely decreased whichever SCOLI is used.

Figure 7.1: Cumulative distribution of real per capita expenditure 1987 to 2002



Notes:

- Real expenditure is nominal expenditure deflated by the preferred index, SCOLI-A (top part) and deflated by the alternative index, SCOLI-B (bottom part). Each SCOLI was reported in Tables 6.1 and 6.2 of Chapter 6.
- Both distributions exclude Aceh, Maluku, and Papua (AMP), since Susenas 2002 was not carried out in these provinces. Excluding the AMP does not change the national poverty incidence by much, as shown in Appendix 7.1.

Source: Author's estimates

The CD for 1987 was on top of the CD for 2002, which means poverty incidence in 1987 was definitely higher than in 2002 for all possible poverty lines. This point is valid for whatever SCOLI is used to estimate the real expenditure (as shown in the top and bottom part of Figure 7.1).

The short-term trend in poverty over these 15 years can be divided into three periods (Figure 7.1). Poverty decreased in the pre-crisis period (1987 to 1996) before jumping in the crisis period (1996-1999), and decreasing again afterwards (1999-2002). The following details the trend in each period.

Poverty decreased steadily during the period 1987 to 1996. Three poverty incidences for three different years were estimated by three different studies: for 1990 by Bidani and Ravallion (1993), for 1993 by Ikhsan (1999), and for 1996 by Pradhan et al. (2000). These studies all applied the same method, the Ravallion lower poverty line, but used a different reference population. It was not clear from these studies whether poverty incidence from 1990 to 1996 diminished steadily or with a fluctuation. This thesis resolves this issue finding that for any possible poverty line, the poverty declined steadily and substantially between 1987 and 1996. Starting from the CD for 1987, which is on top of other CDs, the CD for 1990 was entirely under the CD for 1987 with a substantial vertical distance (top part of Figure 7.1). However, when the real per capita expenditure was estimated from the SCOLI-B (bottom part of Figure 7.1), the CD for 1990 was under the CD for 1987 with a small vertical distance. The CD for 1990 almost overlapped with the CD for 1987 at rather high levels of real per capita expenditure (i.e., from Rp 270 thousand/ month at 2002 prices). This means if the poverty line had been set at that level (almost 3 times the official rural poverty line in 2002) 91 per cent of the Indonesian population in both 1987 and 1990 would have been categorized as being in poverty. Most researchers would agree this level of poverty line is too high to accurately estimate poverty incidence and therefore that poverty in 1987 was higher than in 1990. Continuing to the CD in the following years, the CD for 1993 was under the CD for 1990, and the CD for 1996 was entirely under the CD for 1993. This is valid for whatever SCOLI is used to estimate the real expenditure (top and bottom part of Figure 7.1).

The next episode is the poverty trend in the crisis period. The 1997 crisis reversed the Indonesian success story in poverty alleviation of the preceding years. The crisis put Indonesian poverty in 1999 back to the level of 1990, or at least to sometime *before* 1993. Worse, it possibly put the poverty incidence back to sometime *before* 1990. As can be seen from the top part of Figure 7.1, the Indonesian crisis lifted the CD for 1999 to approach the CD for 1990 and even crossed it at real per capita expenditure of Rp 140 thousand/month at 2002 prices. For every possible level of poverty line set at, or below, Rp 140 thousand per capita/month, poverty incidence in 1999 would have been almost the same as poverty incidence in 1990. For a poverty line above Rp 140 thousand/month, poverty incidence in 1999 would have been even higher than in 1990. Even though the conclusion is sensitive to the SCOLI used to estimate real expenditure, it can still be concluded that the crisis put Indonesian poverty incidence in 1999 back to sometime *before* 1993 (bottom part of Figure 7.1).

By 2002, poverty incidence had declined from the disastrous 1999 level. However, unlike the officially estimated poverty incidence, which indicated the decline reduced poverty to its pre-crisis level of 1996, this thesis demonstrates the decline in poverty from 1999 to 2002 did not represent a return to the 1996 situation. The CD for 2002 was still far above the CD for 1996 for every level of real per capita expenditure. This conclusion is robust whatever the SCOLI used to estimate the real expenditure (top and bottom part of Figure 7.1).

It is only a slight exaggeration to conclude that, in terms of poverty alleviation, the crisis made the 1990s close to a lost decade: despite the rapid progress in poverty alleviation between 1990 and 1996, the poverty situation at the end of the decade (1999) was very little different from at the start (1990). Similarly, in 2002 the poverty situation was little different from that in 1993.

This conclusion contrasts with the findings of recently published studies by Ravallion and Lokshin (2005) and Suryahadi et al. (2006). According to these two studies, the time taken for poverty incidence to fall back to the pre-crisis level of 1996 was much less than the ten years or so that is implied by the estimates of this thesis. According to both these studies, poverty incidence in 2002 was already lower than in 1996.

The main reason for the differences between the present estimates of the time taken for poverty incidence to recover to pre-crisis levels and those of Ravallion and Lokshin and Suryahadi et al. is that the estimates of inflation by province since 1996 used in this thesis are much higher than those used by Ravallion and Lokshin and Suryahadi et al. As mentioned at the end of Sub-section 1.1 of Chapter 1, the latter two studies use the official CPI by province reported by BPS, which actually reflects urban price changes only, whereas this thesis uses provincial inflation estimates constructed by weighting BPS price data on individual items in both urban and rural areas. As shown in Table 6.3 of Chapter 6, the inflation estimates for urban areas in the official CPI, both in aggregate and for sub-groups such as food, housing, etc. are much lower than those based on price data on individual items. In addition, according to the estimates used in this thesis and reported in Table 6.3, inflation in rural areas has been much higher than in urban areas. These reinforcing effects mean that the estimates of provincial inflation since 1996 in this thesis are much higher than the estimates in the other two studies mentioned. The table below summarises the difference between the estimates of inflation in this thesis and the official BPS estimates for urban areas.

Table 7.1: Averages across provinces of alternative estimates of CPI in 1999 and 2002 (1996 = 100)

	BPS urban CPI	BPS rural CPI	Urban CPI from BPS data on individual items (P_urb_179)	Rural CPI from BPS data on individual items (P_rur_68)	Provincial CPI used in the present study; weighted average of cols (3) and (4)
	(1)	(2)	(3)	(4)	(5)
1999	202	265	261	252	255
2002	262	351	331	340	336

Source: all estimates are derived from data in Table 6.3.

Chapter 6 set out the case for preferring the inflation estimates used here to the official BPS estimates for either urban or rural areas. Given both this and the fact (see Sub-section 7.6.1) that most poor people live in rural areas, we believe that the estimates in this thesis of inflation, and the resulting changes in poverty incidence, are more reliable than those of Ravallion and Lokshin (2005) and Suryahadi et al. (2006).

7.3. Trends in poverty: evidence from acute and mild poverty incidence

This section analyses the long-term and short-term rise and fall in both acute and mild poverty incidence from 1987 to 2002.

Table 7.2a presents the trend in total acute poverty incidence based on the UCPL from 1987 to 2002 along with the official estimates as well as the estimates reported by other studies. The UCPL has two estimates. First, the poverty incidence was estimated from poverty lines derived using the preferred index, SCOLI-A (Table 6.1 of Chapter 6, which is, in turn derived using the ***provincial CPI***). Second, it was estimated from poverty lines derived using the alternative index, SCOLI-B (Table 6.2 of Chapter 6, which is, in turn derived using the official CPI).

All HCIs reported in this table exclude Aceh, Maluku, and Papua (AMP). However, excluding AMP has little impact on the total poverty incidence estimates. (Table A7.1 of Appendix 7.1 reports the national poverty incidence including the AMP). For instance, poverty incidence in 1987 without AMP based on the SCOLI-A was 27.0 per cent and including AMP only increases the incidence by 0.5 percentage points to 27.5 per cent.

Including AMP increases the poverty incidence slightly for every year, since the poverty indices in AMP are higher[3] on the average than the national average. Therefore, the time trend analysis of poverty incidence with or without AMP is not much different. Accordingly, the trend analysis is based on the poverty incidence without AMP.

To indicate how poverty incidence changes if the mild poverty line is used, Table 7.2b reports both the acute and mild poverty incidence. It also excludes AMP.

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[3] Poverty incidence in Maluku and Papua for all years was substantially higher than the national average, whereas poverty incidence in Aceh was substantially lower. The average of poverty incidence across AMP is still higher than the national average. Therefore, including AMP increases poverty incidence at the national level by a very small percentage amount. Another reason for the small increase is the combined population in AMP relative to the total Indonesian population is small. For example, the proportion of population in AMP in 1987 was only 3.8 per cent.

Table 7.2a: The total percentage and the number of people below poverty lines from 1987 to 2002 (Excluding Aceh, Maluku, and Papua)

Year	URBAN					RURAL					TOTAL				
	UCPL [a]		BPS [b]		Others	UCPL		BPS		Others	UCPL		BPS		Others
	SCOLI-A	SCOLI-B	Pre-crisis method	Post-crisis method		SCOLI-A	SCOLI-B	Pre-crisis method	Post-crisis method		SCOLI-A	SCOLI-B	Pre-crisis method	Post-crisis method	
	HCI (%)														
1987	10.9	35.1	20.1	-	14.6 [c]	33.5	30.5	16.1	-	16.3 [c]	27.0	31.8	17.3	-	15.9 [c]
1990	12.4	33.6	16.8	-	10.7 [d]	29.3	29.6	14.2	-	23.7 [d]	24.0	30.8	15.0	-	19.8 [d]
1993	7.2	24.6	13.5	-	-	24.0	19.2	13.4	-	-	18.3	21.0	13.4	-	-
1996	5.4	15.1	9.8	13.7	7.2 [e]	16.5	15.2	12.0	19.1	19.8 [e]	12.4	15.2	11.2	17.1	15.2 [e]
1999	15.3	15.1	-	19.5	16.5 [e]	28.1	26.9	-	25.3	33.3 [e]	23.0	22.2	-	23.0	26.6 [e]
2002	9.2	9.2	-	14.4	-	24.3	24.3	-	20.2	-	17.6	17.6	-	17.6	-
	Million people														
1987	5.0	16.2	9.3	-	6.8 [c]	38.5	35.0	18.5	-	19.1 [c]	43.5	51.1	27.8	-	25.9 [c]
1990	6.7	18.1	9.1	-	5.8 [d]	34.5	34.7	16.7	-	27.9 [d]	41.2	52.9	25.8	-	33.9 [d]
1993	4.4	14.8	8.2	-	-	28.3	22.7	15.8	-	-	32.7	37.5	24.0	-	-
1996	3.7	10.4	6.7	9.4	5.0 [e]	19.5	18.0	14.2	22.5	23.4 [e]	23.2	28.3	20.8	31.9	28.3 [e]
1999	12.0	11.8	-	15.3	12.9 [e]	33.1	31.8	-	29.9	39.3 [e]	45.1	43.6	-	45.2	52.3 [e]
2002	8.3	8.3	-	13.0	-	27.4	27.4	-	22.7	-	35.7	35.7	-	35.7	-

Notes:

a) Utility consistent poverty line: author's estimates using the acute poverty line. SCOLI-A column indicates the UCPL was derived from the preferred SCOLI (as for notes in Figure 7.1). The SCOLI-B column indicates the UCPL was derived from the alternative SCOLI.

b) BPS estimates (1999; 2003c, Table 3.5). These estimates are based on 5 different methods of estimating the poverty lines (see Chapter 3 for details). The big change was in 1996, when BPS revised poverty incidence by a factor of 1.5: from 11.3 to 17.5 per cent. If the difference in BPS methods from 1987 to 1996 and from 1996 to 2002 could be ignored, all BPS poverty incidences could be divided into two groups: pre-crisis method referring to all estimates from 1987 to 1996; and post-crisis method referring to all estimates from 1996 to 2002. (see also Table A7.2 of Appendix 7.3 for the estimated 'consistent' BPS HCI from 1987 to 2002)

c) Booth estimates (1992, Table 10.18). The estimate for total HCI and all estimates for the numbers of the poor (in million) are the author's calculation based on Booth's urban and rural poverty incidence.

d) Bidani and Ravallion estimates (1993, Table 4b). All estimates for numbers of poor (in millions) are the author's calculations based on their poverty incidences.

e) Pradhan et al. estimates (2000, Tables 2, 4, A3, and A5)

Source: As mentioned in this table's notes

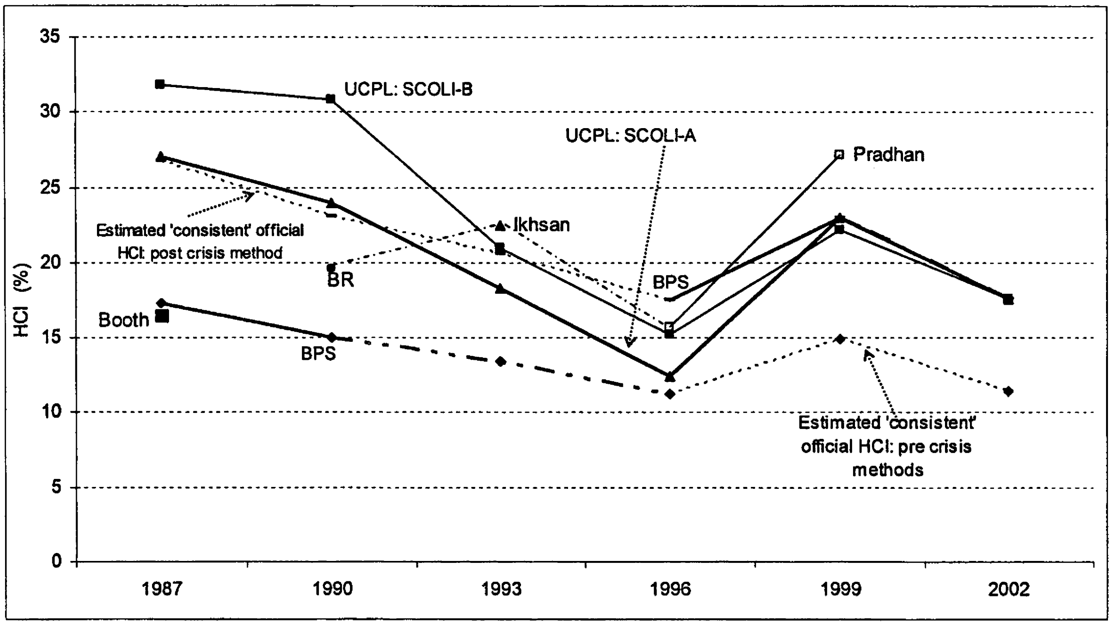
Table 7.2b: The acute and mild poverty incidence based on the UCPL approach from 1987 to 2002 (Excluding Aceh, Maluku, and Papua)

Year	URBAN				RURAL				TOTAL			
	SCOLI-A		SCOLI-B		SCOLI-A		SCOLI-B		SCOLI-A		SCOLI-B	
	Acute	Mild	Acute	Mild	Acute	Mild	Acute	Mild	Acute	Mild	Acute	Mild
	HCI (%)											
1987	10.9	33.9	35.1	63.7	33.5	69.7	30.5	65.4	27.0	59.5	31.8	64.9
1990	12.4	36.9	33.6	62.4	29.3	66.3	29.6	64.8	24.0	57.1	30.8	64.0
1993	7.2	27.9	24.6	52.9	24.0	61.2	19.2	52.8	18.3	50.0	21.0	52.9
1996	5.4	24.1	15.1	40.6	16.5	50.9	15.2	45.9	12.4	41.1	15.2	44.0
1999	15.3	43.7	15.1	43.7	28.1	66.3	26.9	65.1	23.0	57.3	22.2	56.5
2002	9.2	33.3	9.2	33.3	24.3	59.0	24.3	59.0	17.6	47.7	17.6	47.7
	Million people											
1987	5.0	15.6	16.2	29.4	38.5	80.0	35.0	75.0	43.5	95.7	51.1	104.4
1990	6.7	20.0	18.1	33.7	34.5	77.9	34.7	76.2	41.2	97.9	52.9	109.9
1993	4.4	16.9	14.8	31.9	28.3	72.3	22.7	62.4	32.7	89.2	37.5	94.3
1996	3.7	16.5	10.4	27.8	19.5	60.2	18.0	54.3	23.2	76.7	28.3	82.1
1999	12.0	34.2	11.8	34.2	33.1	78.2	31.8	76.8	45.1	112.5	43.6	111.0
2002	8.3	30.0	8.3	30.0	27.4	70.1	27.4	70.1	35.7	100.1	35.7	100.1

Source: Author's estimates

In addition, the trend in acute poverty incidence is also presented in Figure 7.2a. Some calculations were made by the author to present the trend in official poverty incidence in Figure 7.2a. As pointed out in Chapter 1, BPS revised the HCI for 1996 upwards by a factor of 1.55, from 11.3 per cent to 17.5 per cent. Therefore, a comparison cannot be made directly between the official HCI in 1996 (and the following years) and 1987. To assist in comparing the official HCI for the years before and after 1996, the author has calculated two sets of 'consistent' official HCI estimates. These are estimated 'consistent' official HCI based on both the pre-crisis method and the post-crisis method. In doing so, the author used the factor adjustment of 1.55 implied by the ratio of the official HCI estimates for 1996 under the old and new BPS methods. See Table A7.2 of Appendix 7.2 for the estimated 'consistent' BPS HCI from 1987 to 2002. Figure 7.2b shows the trend in mild poverty incidence in comparison with the acute one.

Figure 7.2a: Trends in acute poverty incidence based on the UCPL and other estimates from 1987-2002 (%)

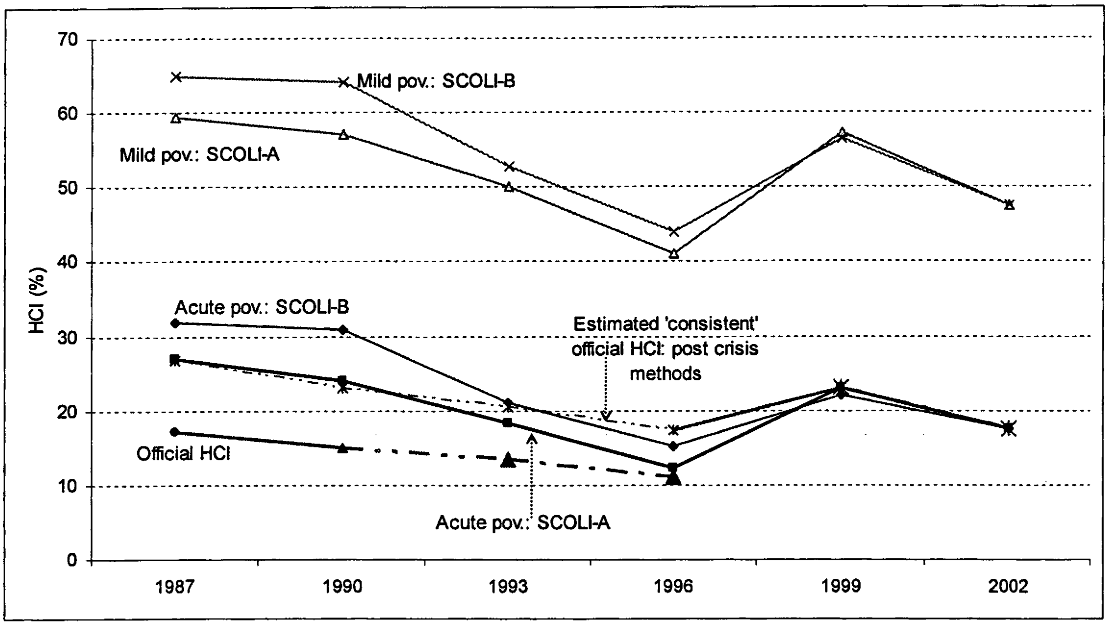


Notes:

- Basically, this is Figure 1.1 of Chapter 1 excluding AMP with the addition of two sets of HCI estimated from the UCPL approach.
- The 'consistent' official HCI for 1987 (that is 'consistent' with the official HCI of 17.6 per cent for 2002 as reported by BPS) was 26.7 per cent. Likewise, the estimated official HCI for 2002 (that is consistent with the official HCI of 17.3 per cent for 1987 reported by BPS) was 11.4 per cent. In other words, if BPS had revised the HCI for the years prior to 1996 using the post-crisis method, it is most likely the HCI for 1987 would have been at the level of 26.7 per cent and for 1990 at the level of 23.1 per cent, which are not very different to the author's estimates using the UCPL. The benchmark for setting the UCPL was the official HCI for 2002, which is generated by the BPS post-crisis method, the HCI based on the UCPL are compared with the 'consistent' official HCI based on the BPS post crisis method (Table A7.2 of Appendix 7.2).

Source: Tables 7.2a and A7.2 of Appendix 7.2

Figure 7.2b: Trend in acute and mild poverty incidence from 1987-2002 (%)



Notes: Basically, this is Figure 7.2a dropping 'others' (as reported in Table 7.2a) and adding mild poverty estimates based on the UCPL (Table 7.2b).

Source: As in the notes

7.3.1. Long-term trend: acute and mild poverty incidence

This section analyses the long-term trend in acute poverty incidence based on the UCPL approach compared with the official estimates, and other researchers' estimates from 1987 to 2002 focusing on the rate of change.

Using a single consistent method, this thesis demonstrates acute poverty incidence fell more sharply than the official 'consistent' HCI during the period 1987 to 1996 and rose more sharply than the official 'consistent' HCI during the period 1996 to 1999 (Figure 7.2a). The first focus will be on the HCI based on the UCPL estimates derived using

SCOLI-A (i.e., the line labelled with UCPL: SCOLI-A in Figure 7.2a). By construction, this HCI was the same as the HCI based on the official estimates in 2002. Before this year, both methods have similar HCI estimates for 1987, 1990, and 1999; with a small discrepancy for 1993, when the UCPL produced a HCI of 2.3 percentage points lower than the 'consistent' official HCI.[4] The only big difference between the two estimates was the HCI for 1996 where the estimated UCPL was 12.4 per cent, 5.1 percentage points lower than the official estimate of 17.1 per cent. Accordingly, the former fell more sharply than the latter for the years just before the crisis period – 1990 to 1996 – and rose more dramatically during the crisis period – 1996 to 1999.

Now turn to HCI based on the alternative UCPL estimates (i.e., the line labelled UCPL: SCOLI-B in Figure 7.2a). The sharp rise and fall in poverty based on the UCPL SCOLI-A estimates can also be observed from the alternative UCPL SCOLI-B estimates. The HCI for the years 1987 to 1996 were all higher for the SCOLI-B estimates than the HCI based on the UCPL SCOLI-A estimates.[5] However, it is clear from the figure that this alternative UCPL fell and rose more sharply than the estimated 'consistent' official HCI between 1993 and 1999.

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[4] The HCI shown in Table 7.2a (under column heading 'pre-crisis') are not used in this comparison. Instead, the estimated 'consistent' official HCI pre-crisis method (as shown in Figure 7.2a) is used.

[5] The difference between the two sets of HCI reflects the difference in setting poverty lines. The poverty lines used to estimate the UCPL SCOLI-B were higher than the UCPL SCOLI-A, which, in turn, reflects the difference in the two SCOLIs (Tables 6.1 and 6.2 of Chapter 6) used to derive both UCPL. As was discussed in Section 6.4 of Chapter 6, the difference between the two SCOLIs is that on average, SCOLI-A grew more quickly during the period 1987-2002 than SCOLI-B.

When the poverty incidence is measured by the mild poverty line, the fall in HCI from 1987 to 1996 is less and so is the rise in the crisis. The distribution of individuals by real expenditure is skewed heavily toward the low-expenditure group and concentrated just above the acute poverty line. Therefore, although the mild poverty line is set only 50 per cent higher than the acute poverty line, mild poverty incidence was more than double acute poverty for every Susenas year. For example, using the mild poverty lines based on SCOLI-A, almost 60 per cent of the Indonesian population in 1987 was poor, whereas acute poverty incidence was only 27 per cent (Table 7.2b and Figure 7.2b).

The following discussion focuses on where and why *acute* poverty incidence indicates a large discrepancy between the author's estimates and the official estimates for 1996. This discrepancy was marked for the three most populous islands of Java, Bali, and Sumatra as well as for all urban areas (Table A7.3 of Appendix 7.3). Based on this table, the number of poor estimated by the UCPL SCOLI-A in 1996 was 9.3 million lower than the official estimates. Of these poor people, 8.5 million were living in these three islands. Even for 1999, when the UCPL and official estimates came up with a very small discrepancy in the total number of poor (less than a quarter of a million people) (Table A7.4 of Appendix 7.3), the largest proportion of persons contributing to this small discrepancy was also located in these three islands. Decomposition by urban and rural areas indicates that 5.8 million of the 9.3 million person difference can be explained by a discrepancy in urban areas (Table A7.3 of Appendix 7.3).

Setting poverty lines with both an over time dimension and an across urban-rural areas dimension can explain the discrepancy. This section discusses only the over time dimension. The urban-rural dimension (which is not only related to the difference in the 1996 poverty incidence, but also to all other years) is discussed separately in Section 7.6. With regard to the over time dimension, the increase in poverty line based on the UCPL approach from 1996 to 1999 was higher than the increase in the official poverty line. (The discrepancy between the two poverty line estimates in each area can be seen in Table A7.5 of Appendix 7.3).

It is most likely that the 'true' inflation rate between 1996 and 1999 was substantially larger than implied by the official poverty lines. Table 7.3 shows the increase in the price of selected individual items from 1996 to 1999 in some provinces in Java and Sumatra. The price of rice (the most important item in the bundle as indicated by its highest expenditure share of 25.3 per cent)[6] rose substantially compared to the inflation estimates implied by the official poverty lines. For instance, the increase in the rice price in urban North Sumatra and urban South Sumatra was 212 and 201 per cent, respectively, both substantially higher than the inflation implied by the official poverty lines. Likewise, the increase in the rice price in all provinces in urban Java was substantially higher than the inflation implied by the official poverty lines. On average, across provinces, the increase in the rice price was 191 per cent, again substantially higher than the 120 per cent inflation average across provinces implied by the official poverty lines. The average price increase across provinces for other important food items, such as in the sub group of fish, tobacco products, and other important non-food

[6] It is the share in 1996, which is different from the share in 2002, and other Susenas years.

items under the sub group of housing, was markedly above the inflation estimates implied by the official poverty lines. The increase in these individual prices indicates the 'true' increase in poverty lines from 1996 to 1999 was most likely substantially larger than implied by the increase in the official poverty lines.

In sum, whatever CPI is used to estimate the UCPL, acute poverty incidence fell sharply between 1987 and 1996, before rising very substantially between 1996 and 1999. This fall and rise was sharper than the official 'consistent' HCI during the same periods. The big discrepancy between the UCPL and official rates of acute poverty incidence was in 1996 when the UCPL estimates the number of poor to be 9.3 million lower than the official estimate. Most of the poor were in Java, Bali, and Sumatra. This discrepancy was because the estimated increase in poverty lines used in the UCPL approach between 1996 and 1999 were higher than implied by the increase in official poverty lines. Based on the increase in individual price data in each province between 1996 and 1999, it is most likely the 'true' inflation rates in that period were substantially higher than implied by the official poverty lines. The use of a mild poverty line more than doubled poverty incidence. When compared with acute poverty, mild poverty incidence fell more slowly in the period 1987-1996 and rose less quickly in the period 1996-1999.

Table 7.3: The percentage price increase of selected individual items from 1996 to 1999 in urban areas of selected provinces of Java and Sumatra (%)

Selected Items	Shares for 1996 (%) [a]	N Sum	S Sum	W Java	C Java	E Java	Average across urban of all provinces
Cereals	***25.29***						
Rice	25.29	212 [b]	201	152	153	184	191
Fish	***5.76***						
Tuna	2.17	212	207	156	255	249	202
Indian mackerel	1.42	156	173	147	289	184	184
Dried fish: *teri*	1.55	340	358	219	336	319	218
Tobacco products	***5.16***						
Unfiltered clove cigarette	4.38	359	122	377	538	405	359
Cost of housing	***14.54***						
Paint	1.39	714	567	398	448	450	258
Tiles for roofing	1.39	173	1482	827	1170	518	653
Timber for pole	1.39	128	21	308	154	135	154
Sand	1.39	234	94	179	222	127	96
Iron sheet	1.39	209	119	207	79	278	155
Cost of labor	1.39	136	88	100	161	99	104
Goods and services	***6.94***						
Toothpaste	0.55	143	140	220	141	167	161
Soap	0.55	261	216	200	212	183	289
Shampoo	0.55	304	450	477	57	316	258
Toothbrush	0.55	135	134	267	86	383	164
Facial powder	0.16	183	356	371	345	304	280
Body lotion	0.16	620	550	141	434	386	274
Average inflation in the region:							
- Author [c]		162	156	153	155	169	155
- Official [d]		118	109	119	121	120	120

Notes:

a) The shares are derived from Susenas 1996. The calculation for the shares is as for the 2002 shares (as explained in Appendix 4.2 of Chapter 4). As the Susenas expenditure data for most non-food items are reported in 'sub-groups', rather than per item, the share of each item is a simple average of the share of the 'sub-group' (see the share of toothpaste, soap, shampoo, and toothbrushes, which have identical shares).

b) For example, 212 means the price of rice in urban North Sumatra rose by 212% from 1996 to 1999.

c) Inflation estimates used in SCOLI-A from 1996 to 1999.

d) Inflation estimates implied by the official poverty line from the (revised) 1996 poverty line to the 1999 poverty line.

Source: Recalculated from BPS (1997a; 2000a) and Susenas 1996

7.3.2. Short-term trend: changes in acute and mild poverty incidence

The discussion now returns to Tables 7.2a and 7.2b to focus on the changes in *the magnitude* of acute and mild poverty incidence pre-crisis, followed by the crisis and after crisis periods. The following analysis is mostly based on the poverty incidence using SCOLI-A.

7.3.2.1. The pre-crisis period in various defined areas

As mentioned, there was a steady and rapid decline in acute poverty incidence from 1987 up until 1996. Acute poverty declined from 27.0 per cent of the total population in 1987 to only 12.4 per cent in 1996. That is, it dropped by more than a half. The relative decline was roughly equal in both urban and rural areas. Although there was a small increase in 1990, acute urban poverty shows the same marked decline in the pre-crisis period. In 1987, 10.9 per cent of the urban Indonesian population was below the acute poverty line and by 1996 this had halved to 5.4 per cent. A marked decline was also found in rural poverty, with the 33.5 per cent of the rural Indonesian population living below the acute poverty line in 1987 falling to 16.5 per cent by 1996.

In contrast, the decline in official poverty incidence has been much slower than indicated by these UCPL estimates (Figure 7.2a). The estimated 'consistent' HCI dropped from 26.7 per cent in 1987 to 17.5 per cent in 1996, or roughly one third.[7] This

[7] This declining rate is not much different when calculated from the original HCI reported by BPS (see the 'pre-crisis' column of Table 7.2a). The official poverty incidence dropped from 17.3 per cent of the total population in 1987 to 11.2 per cent in 1996, or by only 35 per cent relative to the 1987 incidence.

decline was mostly caused by a sharp decline in urban poverty, which more than halved, while rural poverty dropped by only a quarter (see Table 7.2a).[8] Urban poverty dropped from 20.1 per cent in 1987 to 9.8 per cent in 1996, while rural poverty fell from 16.1 per cent to 12.0 per cent.

As mentioned, total mild poverty also steadily declined during the period 1987 - 1996 even though this was rather slow compared with the acute estimate. In 1987, almost 60 per cent of the Indonesian population was in mild poverty (Table 7.2b, Total SCOLI-A). This steadily declined to only 41 per cent by 1996. The SCOLI-B estimates also had the same pattern even though several percentage points higher. That is, falling from 65 per cent in 1987 to 44 per cent in 1996.

The analysis at the provincial level focuses on acute poverty incidence. The marked decline in acute poverty incidence has occurred in all provinces, except for Jakarta, where both the decline and the level of poverty incidence were very low. Table 7.4 shows the decline in poverty incidence in 1996 relative to 1987. Using the national average decline of 53.6 per cent as the border to distinguish provinces with large and low declines, the largest decline in poverty incidence occurred mainly in Western

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[8] The author does not provide estimates of the BPS post crisis method for urban and rural areas. However, the declining rates of the urban and rural official HCI from 1987 to 1996 can be seen from the relevant column under the heading of 'pre-crisis' and the declining or increasing rates of the urban and rural official HCI from 1996 to 2002 can be seen in the relevant column under the heading of 'post-crisis' in Table 7.2a.

Indonesian provinces.[9] Nine out of 14 provinces in this category were located in Western Indonesia, and Bali had the largest declining rate of 86.7 per cent in 1996 relative to 1987. Provinces in Eastern Indonesia dominated the low decline provinces. Seven of 12 provinces in this category were located in Eastern Indonesia, with East Nusa Tenggara having the lowest rate of decline of just over 16 per cent in 1996 relative to 1987.

[9] In the development context, it is common to divide Indonesia into two parts: Western Indonesia, including all provinces in Sumatra island, Java and Bali island; and Eastern Indonesia, including provinces in Kalimantan island, Sulawesi, Nusa Tenggara, Maluku, and in Papua (see for example, BPS 2003e, Table 12.4).

Table 7.4: The decline of acute poverty incidence in 1996 relative to 1987 in each province and urban/rural area (%)

Province [a]	Head count index (%)						Rate of decline in total poverty incidence in 1996 relative to 1987 (%)
	1987			1996			
	Urban	Rural	U+R [b]	Urban	Rural	U+R	
Bali	18.6	37.5	33.3	5.0	5.1	5.1	84.8
S Kalimantan	4.0	17.3	13.9	1.5	3.0	2.5	81.8 (Eastern)
W Sumatra	2.7	18.0	15.3	1.0	3.6	3.0	80.6
Jambi	3.8	16.0	13.8	1.6	3.3	2.9	79.3
Riau	6.9	25.1	19.6	2.1	8.5	6.3	67.8
E Kalimantan	11.8	25.7	19.3	1.9	11.0	6.4	66.7 (Eastern)
C Kalimantan	34.6	69.0	63.8	11.2	25.4	22.2	65.3 (Eastern)
Yogyakarta	11.7	25.4	20.4	4.4	10.0	7.2	64.5
N Sumatra	5.3	22.3	16.8	1.7	10.0	6.5	61.2
Aceh	5.0	20.6	18.5	2.7	8.5	7.3	60.7
C Java	13.7	41.1	34.4	5.5	18.0	14.0	59.4
W Nusa Tenggara	27.9	46.8	43.7	8.5	20.3	18.1	58.6 (Eastern)
W Kalimantan	19.8	51.8	45.8	5.7	23.3	19.5	57.4 (Eastern)
W Java	18.4	29.8	26.4	8.2	14.0	11.5	56.5
S.Sumatra	9.6	25.7	21.1	1.5	13.4	9.8	53.5
S Sulawesi	12.8	37.9	32.3	4.9	20.8	16.3	49.8 (Eastern)
S E Sulawesi	13.6	59.7	53.1	11.6	31.9	27.3	48.5 (Eastern)
E Java	9.3	28.5	23.8	7.7	14.6	12.4	47.9
Maluku	10.7	70.7	61.0	8.2	42.3	33.9	44.5 (Eastern)
Papua	19.2	73.1	60.5	4.5	44.0	33.9	44.0 (Eastern)
Lampung	9.1	34.4	31.3	7.2	20.3	18.2	41.9
C Sulawesi	4.5	34.3	30.2	8.2	20.3	17.6	41.6 (Eastern)
N Sulawesi	14.7	36.9	32.3	5.1	26.5	20.9	35.5 (Eastern)
Bengkulu	7.6	19.0	17.1	4.9	13.7	11.4	33.4
E Nusa Tenggara	28.2	74.5	69.8	24.7	63.7	58.2	16.6 (Eastern)
Jakarta	0.7	.	0.7	0.7	.	0.7	3.9
INDONESIA [b]	10.9	34.0	27.5	5.4	16.9	12.8	53.6

Notes:

a) Provinces are ranked in descending order from the province with the largest to the smallest decline.

b) Population weighted average.

Source: Author's estimates

7.3.2.2. The crisis and after in various defined areas

This sub-section investigates the effects of the crisis on the poverty incidence over time in urban and rural areas, and Western and Eastern Indonesia's provinces. It also investigates the incidence after the crisis.

During the crisis, urban people suffered more than rural people. As can be seen in Table 7.2a, urban poverty incidence tripled from 5.4 per cent in 1996 to 15.3 per cent in 1999, while rural poverty incidence increase less than doubled going from 16.5 per cent to 28.1 per cent during the same period. The urban increase is equivalent to tripling from 3.7 million poor people in 1996 to 12 million in 1999 (bottom part of the table). Rural poverty rose from 19.5 million poor people in 1996 to 33.1 million 1999.

This confirms, to some extent, the findings of other studies (Table 7.2a). Urban poverty incidence estimated by Pradhan et al. more than doubled from 7.2 per cent in 1996 to 16.5 per cent in 1999, while rural poverty incidence rose by less than double from 19.8 per cent in 1996 to 33.3 per cent in 1999. In contrast to these two studies, the BPS estimates show a smaller jump in urban poverty incidence, although they still show that urban poverty incidence increased by more, proportionately, than rural poverty incidence. Therefore, all these estimates (by the author, Pradhan et al., and BPS) agree that the urban poor suffered more from the crisis than the rural poor. Sumarto et al. (1998) also concluded urban areas had been harder hit by the crisis than rural areas.

This jump in total poverty was also found when using a mild poverty line. Mild poverty increased from 41 per cent in 1996 to 57 per cent in 1999, an increase of almost 40 per cent compared to 1996 (Table 7.2b, column: total SCOLI-A).

The effects of the crisis on acute poverty across provinces were also uneven. On average, Western Indonesia (Java, Bali, and Sumatra) suffered more than Eastern Indonesia. Table 7.5 shows the jump of poverty incidence in 1999 relative to 1996. Taking the national average jump of 84.5 per cent as a border to distinguish between provinces, the large jump was mostly in Western Indonesian provinces, involving 10 out of 12 provinces in this category. Jambi was the province that suffered most from the crisis, with poverty incidence rocketing almost 6 times from slightly below 3 per cent to 16.7 per cent.

The uneven effect of the crisis on poverty incidence is related to its uneven sectoral effect. GDP fell by almost 14 per cent in 1998, but the sectoral effects were uneven. The effect on agricultural sector was relatively small in magnitude, i.e., the growth in this sector was -1.3 per cent. However, the effect on non-agricultural sectors, such as manufacturing, construction, trade, transport, and finance, was dramatic. The growth rate in each of these sectors was -11.4 per cent, -34.6 per cent, -18.2 per cent, -19.9 per cent, -26.6 per cent, respectively (author's calculation based on the CEIC data base).

Table 7.5: The jump of acute poverty incidence in each province and urban/rural areas caused by the economic crisis (1996 to 1999)

Province)a	Head count index (%)						Rate of increase in total poverty incidence (%)	rank	Inflation estimates from 1996 to 1999	rank
	1996			1999						
	Urban	Rural	U+R	Urban	Rural	U+R				
Jambi	1.6	3.3	2.9	9.3	20.1	16.7	486.3	1	155.4	14
Jakarta	0.7	.	0.7	3.3	.	3.3	381.1	2	155.6	13
S Kalimantan *	1.5	3.0	2.5	4.4	11.9	9.6	276.6	3	148.3	17
W Sumatra	1.0	3.6	3.0	5.3	8.0	7.2	142.4	4	155.9	12
Yogyakarta	4.4	10.0	7.2	12.0	28.6	17.4	141.1	5	161.6	8
E Kalimantan *	1.9	11.0	6.4	7.9	22.2	14.9	131.6	6	131.6	22
W Java	8.2	14.0	11.5	22.7	29.8	26.4	129.8	7	152.8	16
N Sumatra	1.7	10.0	6.5	8.9	19.8	14.9	128.1	8	161.7	7
E Java	7.7	14.6	12.4	21.4	31.5	27.9	125.3	9	169.2	5
Aceh	2.7	8.5	7.3	7.3	18.7	15.9	118.4	10	159.8	11
C Java	5.5	18.0	14.0	16.9	31.9	26.6	89.9	11	155.2	15
S Sumatra	1.5	13.4	9.8	12.1	20.8	18.1	84.9	12	148.0	18
Bali	5.0	5.1	5.1	10.2	7.8	8.8	73.4	13	160.7	9
Papua	4.5	44.0	33.9	13.3	74.0	58.1	71.6	14	179.6	2
W Nusa T	8.5	20.3	18.1	21.5	32.8	30.6	68.9	15	178.4	4
Maluku	8.2	42.3	33.9	28.5	65.5	55.2	63.1	16	179.5	3
C Sulawesi	8.2	20.3	17.6	18.4	30.9	27.6	56.7	17	142.2	19
Bengkulu	4.9	13.7	11.4	7.9	20.4	16.8	47.3	18	136.9	20
N Sulawesi	5.1	26.5	20.9	14.2	35.3	29.2	40.1	19	186.6	1
S E Sulawesi	11.6	31.9	27.3	14.3	44.6	36.9	34.9	20	159.9	10
Lampung	7.2	20.3	18.2	8.8	27.4	24.0	31.9	21	133.5	21
S Sulawesi	4.9	20.8	16.3	14.4	24.3	21.2	30.7	22	163.0	6
E Nusa T	24.7	63.7	58.2	30.1	68.8	63.7	9.3	23	122.9	23
Riau	2.1	8.5	6.3	3.1	7.0	5.5	-12.0	24	120.8	24
C Kalimantan	11.2	25.4	22.2	8.1	21.9	18.1	-18.2	25	113.1	25
W Kalimantan	5.7	23.3	19.5	2.1	17.2	13.8	-29.4	26	112.3	26
INDONESIA	***5.4***	***16.9***	***12.8***	***15.3***	***28.9***	***23.5***	**84.5**		**155.3**	

Note:

a) Provinces ranked in descending order from the province with the largest to the smallest jump. The top part of this column consists of provinces located in western Indonesia, except for East and South Kalimantan (i.e., provinces with symbol *).

Source: Author's estimates

The non-agricultural sectors are generally located in urban areas. Therefore, when these sectors were severely hit by the crisis employment suffered more. The non-agricultural sectors also dominated regional GDP in Western Indonesia but generally not in Eastern Indonesia. For example, as the crisis hit, employment in the manufacturing sector fell by a large margin in the major industrial centres of Jakarta, West Java, and East Java. According to Manning (2000), although employment also fell in other islands, "many more jobs were lost in manufacturing in Java-Bali, even though the overall contraction in manufacturing employment was smaller" (p.133).

Even over the crisis period, the three provinces of Riau and Central and West Kalimantan still recorded a decline in poverty rates. The low inflation estimates from 1996 to 1999 might be the reason why poverty incidence did not jump in these three provinces. As can be seen from Table 7.5, these three provinces had the lowest inflation estimates over the crisis period followed by East Nusa Tenggara. Nevertheless, the overall Spearman rank correlation between inflation and the increase in poverty across provinces from 1996 to 1999 was insignificant at the level of 10 %.

In 2002, both acute and mild poverty incidences were still higher than their 1993 levels. Total acute poverty incidence did decrease between 1999 and 2002, but by 2002 had only decreased to 17.6 per cent, more than 5 percentage points above the incidence in 1996 (Table 7.2b: acute by SCOLI-A). Likewise, the total mild poverty incidence (using SCOLI-A) dropped from 57.3 per cent in 1999 to 47.7 per cent in 2002. This was still higher than 1996 level of 41.1 per cent.

The data above are in contrast with the official figures, which indicate the poverty level in 2002 was roughly at the 1996 level, 17.1 per cent (Table 7.2a in the column heading total: BPS 'post-crisis').

7.3.2.3. Poverty incidence by production sectors: sharp rise and fall in the crisis period and afterwards

This sub-section analyses the development of poverty incidence over the crisis period by production sectors and focuses on acute poverty. The poverty incidence in this section uses the household level rather than the individual as the unit of measurement. This is because once a household is categorized as poor, all family members in the household are also categorized as poor regardless as to whether they are in working ages or not, employed or not, and what sector they were employed in. For simplicity, throughout this section households are classified to production sectors as if all members of the households were employed in the same sector as the household head.

As mentioned in Sub-section 7.3.2.2, the sectoral effects of the crisis that hit Indonesia in mid 1997 were uneven. Table 7.6a shows the decomposition of poor households by production sector across Western and Eastern Indonesia. The first impression from this table is that the percentage of poor households in the agricultural sector has been relatively larger than poor households in other sectors. This holds for both urban and rural areas in Western and Eastern Indonesia and for all years. Other sectors having a relatively large percentage of poor households were construction, manufacturing, trade, and transportation. For example, in 1996, the number of poor households in the agricultural sector in Western Indonesia was 13.4 per cent on average, whereas for manufacturing and the construction sectors the numbers were 5.5 per cent and 7.4 per cent, respectively.

The depth of the rise and fall in poverty at the household level can be measured by the ratio of poverty within each area (and sector) in any one year relative to the previous year. During the crisis period (1996 to 1999), the ratios are mostly larger than unity indicating the rise (Table 7.6b). A larger ratio indicates a sharp rise in poverty. Conversely, after the crisis (1999 to 2002), the ratios are mostly lower than unity indicating a fall. A lower ratio indicates a large fall in poverty.

Three conclusions can be drawn from this table. Firstly, the rise and fall in poverty has been sharper in urban than rural households for most sectors. During the crisis, the ratios of poverty incidence in 1999 to 1996 for urban areas both in Western and Eastern Indonesia were larger than the ratios in rural areas. Conversely, the same ratios for 2002 to 1999 in urban areas were lower than in rural areas. Secondly, the rise and fall in poverty has been sharper in households working in non-agricultural sectors than in agricultural sectors. On average, poor households working in non-agriculture rose sharply compared with poor households working in agriculture during the crisis. However, the decline was faster after the crisis. Thirdly, the rise and fall in poverty has been sharper in households in Western Indonesia than in Eastern Indonesia.

Table 7.6a: Percentage of households in acute poverty over the crisis period and after by sector in which household head was employed [a)]

Sectors	Western Indonesia			Eastern Indonesia			Indonesia		
	Urban	Rural	U+R	Urban	Rural	U+R	Urban	Rural	U+R
				1996					
Agriculture	11.2 [a)]	13.6	13.4	16.4	29.0	27.8	12.6	18.5	17.9
Mining	2.3	7.1	4.2	2.4	12.3	6.0	2.3	8.5	4.7
Manufacturing	3.1	8.6	5.5	6.7	14.8	11.5	3.7	10.2	6.7
Electricity	3.4	1.4	2.8	1.7	5.9	2.7	2.9	2.3	2.7
Construction	5.8	8.9	7.4	11.2	15.5	13.1	7.2	10.3	8.8
Trade	2.5	5.4	3.6	5.0	10.4	6.8	3.1	6.5	4.4
Transport	3.3	4.4	3.7	7.1	9.5	8.0	4.2	5.5	4.7
Financial sector [b)]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Services	2.1	4.9	3.1	3.8	7.6	5.0	2.7	5.7	3.7
Others	11.9	15.1	13.3	0.0	40.0	19.0	10.3	19.0	14.2
Total	**3.7**	**10.7**	**7.9**	**6.1**	**23.0**	**16.4**	**4.4**	**14.2**	**10.3**
				1999					
Agriculture	23.7	24.9	24.8	33.6	35.6	35.4	26.3	28.1	27.9
Mining	12.3	30.3	21.2	5.3	10.0	8.0	9.8	21.6	15.9
Manufacturing	11.0	18.2	14.0	11.0	18.6	16.0	11.0	18.3	14.4
Electricity	5.6	5.6	5.6	17.2	21.1	18.8	8.0	10.9	8.9
Construction	16.2	21.1	18.8	16.4	21.5	18.7	16.3	21.2	18.8
Trade	8.1	15.2	10.9	10.2	12.8	11.0	8.6	14.8	10.9
Transport	13.8	15.7	14.5	12.1	14.6	13.0	13.4	15.5	14.2
Financial sector	1.7	9.3	3.0	0.0	9.5	1.9	1.4	9.4	2.8
Services	7.2	10.6	8.3	6.0	9.4	7.1	6.8	10.2	8.0
Others	8.5	21.1	13.7	9.0	26.7	16.2	8.6	22.5	14.3
Total	**10.6**	**21.4**	**16.8**	**11.5**	**28.4**	**21.9**	**10.9**	**23.3**	**18.1**
				2002					
Agriculture	12.2	21.4	19.4	21.0	31.7	30.7	13.6	24.6	22.6
Mining	6.2	16.9	10.4	9.0	15.9	13.6	6.7	16.5	11.3
Manufacturing	3.0	11.5	4.5	11.8	17.3	15.1	3.6	13.5	5.9
Electricity	8.3	14.8	10.9	9.7	20.6	14.5	8.6	16.0	11.6
Construction	4.0	10.4	6.0	6.2	21.6	14.3	4.4	14.1	7.9
Trade	5.5	11.0	7.1	8.5	15.0	11.0	6.1	12.0	7.9
Transport	1.1	3.8	1.6	2.3	3.6	2.7	1.4	3.7	1.9
Financial sector	1.0	4.1	2.1	4.7	9.4	7.4	1.8	6.1	3.5
Services	5.9	13.4	7.7	11.7	17.9	13.5	6.6	14.1	8.4
Others	4.7	17.9	9.2	6.7	27.0	17.0	5.1	20.5	10.8
Total	**5.9**	**18.0**	**11.9**	**9.0**	**26.9**	**21.3**	**6.4**	**20.8**	**14.2**

Notes:

a) That is, for example, the 11.2 means that 11.2% of urban households where the household head was working in the agricultural sector in Western Indonesia in 1996 were in acute poverty.

b) In 1996, household heads worked in this sector were less than 1 per cent and none were poor.

Source: Author's estimates from Susenas data and UCPL (SCOLI-A)

Table 7.6b: The ratio of poor households in each area and each sector between two adjacent years during the crisis period and afterwards

Sector	Western Indonesia			Eastern Indonesia			Indonesia		
	Urban	Rural	U+R	Urban	Rural	U+R	Urban	Rural	U+R
	Poor households in 1999 relative to 1996 [b]								
Agriculture	2.1 [a]	1.8	1.9	2.1	1.2	1.3	2.1	1.5	1.6
Mining	5.4	4.3	5.1	2.2	0.8	1.3	4.2	2.5	3.4
Manufacturing	3.6	2.1	2.6	1.7	1.3	1.4	3.0	1.8	2.2
Electricity	1.6	3.8	2.0	10.0	3.6	7.0	2.7	4.7	3.2
Construction	2.8	2.4	2.5	1.5	1.4	1.4	2.3	2.1	2.1
Trade	3.3	2.8	3.0	2.0	1.2	1.6	2.7	2.3	2.5
Transport	4.1	3.6	3.9	1.7	1.5	1.6	3.2	2.8	3.0
Financial sector [c]	-	-	-	-	-	-	-	-	-
Services	3.4	2.2	2.7	1.6	1.2	1.4	2.5	1.8	2.1
Others	0.7	1.4	1.0	-	0.7	0.9	0.8	1.2	1.0
Total	**2.9**	**2.0**	**2.1**	**1.9**	**1.2**	**1.3**	**2.5**	**1.6**	**1.8**
	Poor households in 2002 relative to 1999 [d]								
Agriculture	0.5	0.9	0.8	0.6	0.9	0.9	0.5	0.9	0.8
Mining	0.5	0.6	0.5	1.7	1.6	1.7	0.7	0.8	0.7
Manufacturing	0.3	0.6	0.3	1.1	0.9	0.9	0.3	0.7	0.4
Electricity	1.5	2.7	2.0	0.6	1.0	0.8	1.1	1.5	1.3
Construction	0.2	0.5	0.3	0.4	1.0	0.8	0.3	0.7	0.4
Trade	0.7	0.7	0.7	0.8	1.2	1.0	0.7	0.8	0.7
Transport	0.1	0.2	0.1	0.2	0.2	0.2	0.1	0.2	0.1
Financial sector	0.6	0.4	0.7	-	1.0	3.9	1.3	0.7	1.3
Services	0.8	1.3	0.9	2.0	1.9	1.9	1.0	1.4	1.1
Others	0.6	0.8	0.7	0.8	1.0	1.0	0.6	0.9	0.8
Total	**0.5**	**0.8**	**0.7**	**0.8**	**0.9**	**1.0**	**0.6**	**0.9**	**0.8**

Notes:

a) For example, 2.1 = 23.7/11.2 (poor households in agricultural sectors in 1999 divided by poor households in agricultural sectors in 1996).

b) The ratios in this part are mostly larger than unity indicating the jump in poverty during the crisis. A larger ratio indicates a larger jump in the number of poor households.

c) See note 'b' in Table 7.6a.

d) The ratios in this part are mostly less than unity indicating the fall in poverty following the crisis. A lower ratio indicates a larger decline in the number of poor households.

Source: Author's estimates (calculated from Table 7.6a)

7.4. Trends in poverty: evidence from other poverty indices

So far, poverty has been measured in terms of poverty incidence (HCI). The following discussion focuses on the poverty trend using the poverty gap index (PGI) and the severity of poverty index (SPI). The HCI is still reported for comparison (Table 7.7 and Figure 7.3).

The fluctuation in patterns of the PGI and SPI confirm the direction of the change in poverty based on the HCI discussed in previous sections. Between 1987 and 1996, PGI and SPI declined steadily and markedly. Over the crisis period, both indicate poverty returned to the level of 1990, or to somewhere between the 1990 and 1993 level. By 2002, PGI and SPI indicate poverty declined from the 1999 level, but that they have not yet returned to the 1996 levels. Both PGI and SPI for 2002 were still far above their 1996 levels.

PGI and SPI for 1999 and 2002 are not much different from the same index reported by the BPS (2003c, Table 5.1). This is not surprising, since the HCI estimated by the UCPL approach was identical in 2002 and almost similar in 1999 with the ones estimated by BPS (see Figure 7.2a).

The PGI shown in the table reveals that the average expenditure of the poor was not far below the poverty line. The highest PGI was in 1987 and was only 5.7 per cent and by 2002, it had declined to 3.2 per cent.

Table 7.7: Three dimensions of the acute poverty from 1987 to 2002 (%)

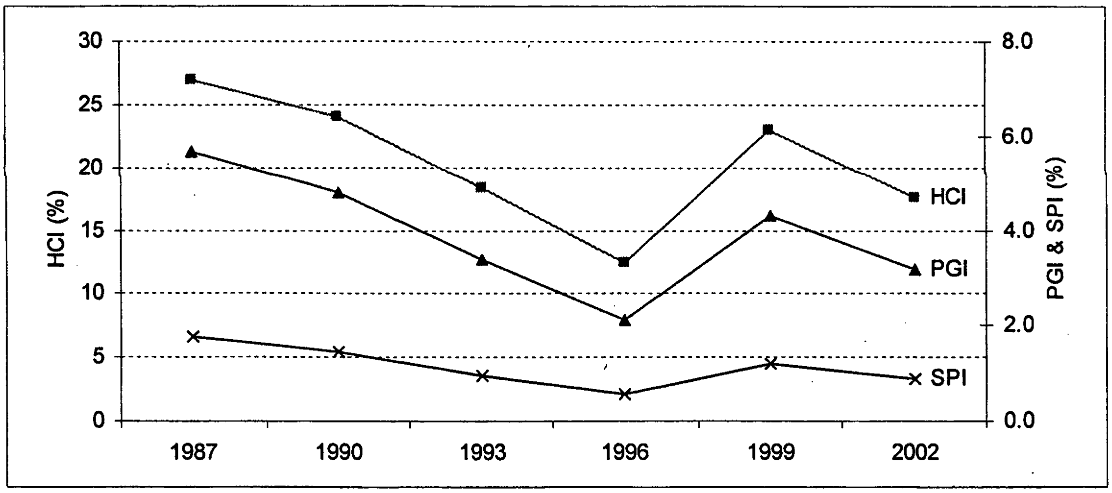
Year	Urban			Rural			Total		
	HCI	PGI	SPI	HCI	PGI	SPI	HCI	PGI	SPI
1987	10.9	1.9	0.5	33.5	7.2	2.3	27.0	5.7	1.8
1990	12.4	2.3	0.6	29.3	6.0	1.8	24.0	4.8	1.4
1993	7.2	1.1	0.3	24.0	4.5	1.3	18.3	3.4	0.9
1996	5.4	0.8	0.2	16.5	2.9	0.8	12.4	2.1	0.6
1999	15.3	2.8	0.8	28.1	5.3	1.5	23.0	4.3	1.2
2002	9.2	1.5	0.4	24.3	4.5	1.3	17.6	3.2	0.9

Notes:

- All indices are excluding AMP

Source: Author's estimates

Figure 7.3: The trends in three dimensions of acute poverty 1987-2002



Notes and Source: As for Table 7.7

In terms of poverty alleviation programs, the poverty gap for 2002 implies that, in a purely accounting sense, the minimum value of transfer to keep people out of poverty in 2002 was Rp 705.7 billion per month. This does not mean of course that such a relatively small amount of money could remove poverty. Allocating money to the poor and not changing incentives would be very difficult, to say the least. As can be seen from Table 7.7, urban PGI for 2002 was 1.5. Since the average urban poverty line for 2002 was Rp 115.5 thousand, the PGI of 1.5 per cent means - as described in Section 2.4 of Chapter 2 - the expenditure on transfer needed to keep urban people free from poverty is Rp 158.1 billion per month.[10] Likewise, since the rural poverty line for 2002 was Rp 101.2 thousand, the rural PGI of 4.5 per cent means the expenditure needed to eliminate poverty is Rp 547.7 billion per month.[11] So total expenditure required to keep Indonesia poverty free in 2002 is Rp 705.7 billion per month. This amount of money is quite small compared to, for example, development expenditure in 2002, which was Rp 37,325 billion a year[12] (or Rp 3,110 billion per month on average).

7.5. Why relative poverty measures are misleading

As mentioned in Section 2.3.1 (Chapter 2), one objection to relative poverty lines is that they are potentially misleading indicator. This section demonstrates the use of relative poverty for monitoring poverty over time is misleading.

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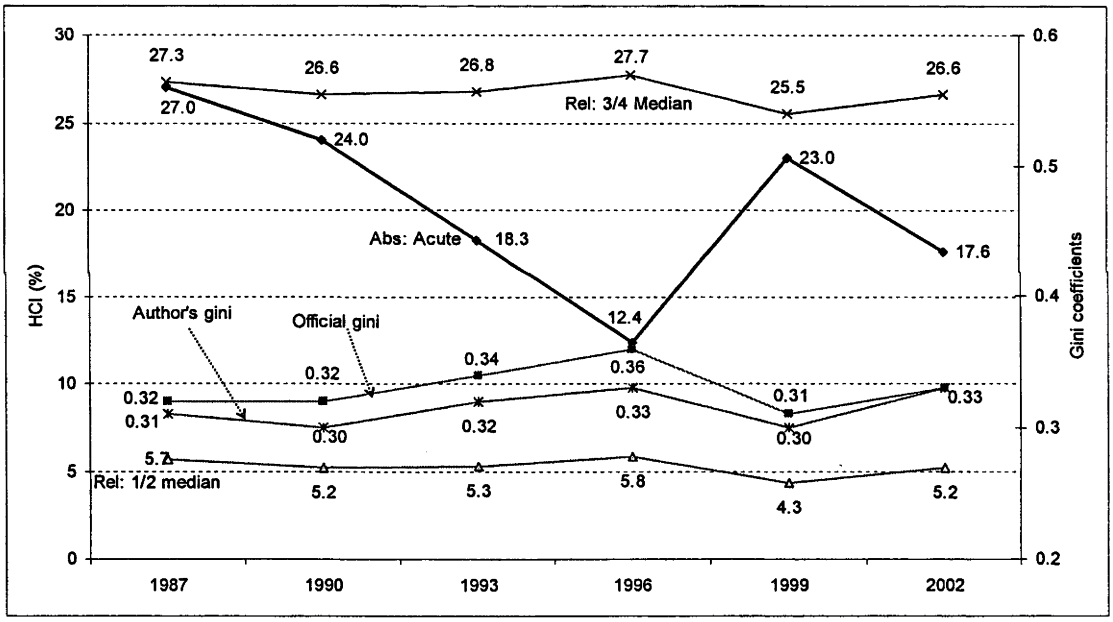
[10] The calculation is as follows. The expenditure needed =PGI*PL*POP in 2002. That is, poverty gaps multiplied by urban poverty lines and multiplied by the urban population (all for 2002). In numerical value, the expenditure needed in urban areas = .015 * 115.5 thousand * 92.2 millions.

[11] The calculation is as in the previous footnote. In numerical value, the expenditure needed in rural areas = .045 * 101.9 thousand * 118.9 millions.

[12] Based on Table ID.F01 CEIC Asia Database.

Figure 7.4 shows trends in absolute poverty and relative poverty. Absolute poverty is represented by the acute poverty incidence reported in Figure 7.2a (UCPL: SCOLI-A). Relative poverty is represented by two poverty incidences. First, the poverty incidence was estimated using a poverty line set at a level of ½ the median real per capita expenditure. Second, it was estimated using a poverty line set at a level of ¾ the median. In addition, the figure shows inequality measures as represented by two Gini coefficients, namely the author's Gini and the official Gini (See Appendix 7.4 for detailed Gini coefficient calculations).

Figure 7.4: Absolute poverty, Relative poverty, and Gini coefficients (1987-2002)



Notes: 'Rel. 3/4 median' and 'Rel. 1/2 median' is the poverty incidence based on *relative* poverty lines set at ¾ and ½ of median of real per capita expenditure. 'Abs: Acute' is the acute poverty incidence discussed already. All poverty incidences use left-hand axes and the Gini coefficients use right-hand scale. Mild poverty incidence is not reported in this figure.

Source: Table A7.6 of Appendix 7.4

Figure 7.4 shows relative poverty is a very misleading indicator for monitoring poverty over time. The discussion on absolute poverty so far shows poverty incidence steadily and markedly declined from 1987 to 1996, and rose sharply by 1999 before declining again by 2002. In contrast, both relative poverty incidences shown in Figure 7.4 were roughly constant over time during this entire period. Relative poverty using ½ of the median fluctuated in very small magnitude, i.e., between 4.3 per cent and 5.8 per cent. Using ¾ of the median, relative poverty also hardly fluctuated, i.e., between 25.5 per cent and 27.7 per cent. Within this small magnitude in fluctuation, the patterns were also totally different to the patterns in absolute poverty. When absolute poverty decreased substantially between 1990 and 1996, both relative poverty estimates increased. When absolute poverty jumped in 1999, both relative poverty estimates went down and even reached the lowest point (at 4.3 per cent and 25.5 per cent) for the whole period! While there is no doubt absolute poverty increased sharply in 1999 as shown in all studies (see Table 7.2a), relative poverty indicates the contrary.

The two Gini coefficients fluctuated in almost the same direction, except for 1990, when the official Gini was constant compared to the previous year and the author's Gini went down slightly (Figure 7.4). The official Gini was at the minimum point in 1999 and the author's Gini in 1999 was one of the minimum points.

Relative poverty is a measure of inequality rather than a measure of poverty incidence. The fluctuation in relative poverty measures during 1987 and 2002 has been exactly the same as the fluctuation in inequality measures (i.e., the two Gini coefficients) (Figure 7.4). They went down between 1987 and 1990, up between 1990 and 1996 and reached a maximum level at 1996, dropped to the lowest level in 1999, and then went up again in 2002.

While it is interesting to compute the proportion of the population with expenditure less than half or three quarters of the median, calling the resulting measure "relative poverty" is very misleading. It should be called "inequality". To say the crisis reduced relative poverty is a misleading way of saying it reduced inequality.

7.6. Variations in poverty incidence across regions and changes over time

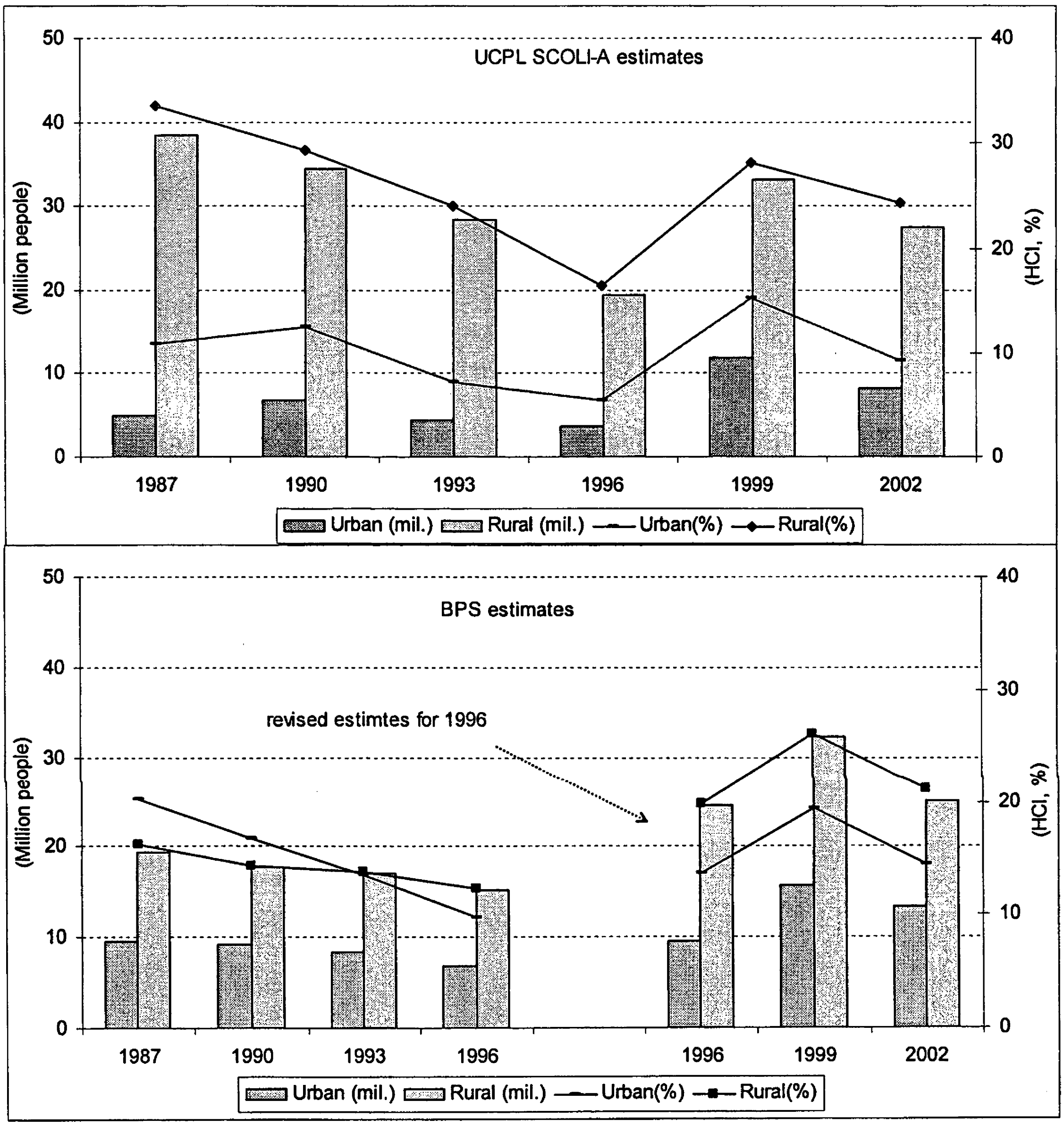
7.6.1. Across urban and rural areas

This sub-section explores the distribution of poverty between urban and rural areas. The different estimates of the urban and rural cost of living (U-R COL gap) caused a big difference in the distribution of poverty incidence across urban and rural areas between the UCPL and the official estimates. This was true not only in 1996, but also in other years as mentioned at the beginning of Section 7.3. The difference in setting urban and rural poverty lines between the two approaches is a reflection of the large difference in the U-R COL gap discussed in Section 4.5.1 of Chapter 4.

According to the author's estimates, poverty incidence has been concentrated in the rural areas for each Susenas year. The percentage of the urban population living below the acute poverty line was only 10.9 per cent in 1987, which is less than one-third of the percentage of rural population living below this line, which was 33.5 per cent of the total rural population (Table 7.2a: UCPL SCOLI-A and Figure 7.5, top part). Over time, while the percentage of urban poverty fluctuated, the incidence has still been far below rural poverty incidence. Urban poverty incidence was just above half of rural poverty incidence in 1999. This was due to the huge jump in urban poverty between 1996 and 1999. Urban poverty incidence was 15.3 per cent in 1999 and rural poverty incidence was 28.1 per cent. In contrast, the official figure shows urban poverty incidence higher than rural for both 1987 and 1990, almost similar to rural poverty in 1993, and then lower than rural poverty in 1996. Urban poverty according to the revised official estimates both for 1996 and the following years became much lower relative to rural poverty than previous estimates (Figure 7.5, bottom part).[13]

[13] The urban and rural HCI reported in this figure still use the original BPS estimates (BPS1-3 and BPS4–5). Given the factor adjustment of 1.55 that has been applied and reported in Appendix 7.2, the urban-rural distribution of poverty incidence will not change if this factor adjustment is taken into account.

Figure 7.5: The decline in acute poverty by urban and rural areas based on UCPL SCOLI-A and BPS estimates: 1987-2002



Notes: All excludes AMP

Source: As for Table 7.2a

With regard to the proportion of urban poor to total poor, the proportion of poor living in urban areas increased rapidly between 1987 and 2002, but was still quite low compared to the official estimates. According to the official estimates, the percentage of poor people living in urban areas has on average been above 30 per cent of total poor over the period 1987 to 2002 (Table 7.8).[14] According to the UCPL approach, the percentage of poor living in urban areas in 1987 was actually quite small at only 11 per cent of total poor. The percentage of urban poor doubled to 23 per cent in 2002, but this was still less than the official estimates of 32 per cent of the total poor in 1987 and 34.6 per cent in 2002. The proportion of urban poor based on the UCPL is consistent with the Bidani and Ravallion estimate for 1990, and the Pradhan et al. estimates for 1996 and 1999, as shown in Table 7.8.

The change in poverty will now be decomposed into the change of poverty incidence within each area (urban and rural areas) and the change due to population shift. In this decomposition, the population shift is a decline in the proportion of the population living in rural areas. The decomposition applied in this thesis uses the following equation (The derivation is reported in Appendix 7.5):

7.1 $$h_t - h_{t-3} = \left(\frac{w_t + w_{t-3}}{2}\right)(h_t^R - h_{t-3}^R) + \left(1 - \frac{w_t + w_{t-3}}{2}\right)(h_t^U - h_{t-3}^U)$$

---

[14] Again, this figure has not yet been adjusted for pre crisis and post crisis method. However, the proportion is invariant with the adjustment factor.

$$+\left(\frac{h_t^R + h_{t-3}^R - h_t^U - h_{t-3}^U}{2}\right)(w_t - w_{t-3})$$

where h_t is the national head count index in year t; h_t^R is the head count index in rural areas; h_t^U is the head count index in urban areas and w_t is the proportion of the population living in rural areas.

Table 7.8: The percentage of the poor population living in urban and rural areas

Year	Urban			Rural		
	UCPL a)	BPS b)	Others	UCPL a)	BPS b)	Others
1987	11.2	32.3	25.1 c)	88.8	67.7	74.9 c)
1990	15.8	34.6	17.0 d)	84.2	65.4	83.0 d)
1993	12.9	33.6	-	87.1	66.4	-
1996	15.3	32.0	16.5 e)	84.7	68.0	83.5 e)
		27.7 f)			72.3 f)	
1999	25.5	32.6	23.6e)	74.5	23.6	76.4 e)
2002	23.1	34.6	-	76.9	65.4	-

Notes:

a) Author's estimates

b) Author's calculation based on BPS estimates (1999; 2003c Table 3.5)

c) Author's calculation based on Booth estimates (1992 Table 10.18)

d) Author's calculation based on Bidani and Ravallion estimates (1993 Table 4b)

e) Author's calculation based on Pradhan et al. estimates (2000 Table A3 and A5)

f) Author's calculation based on BPS revised estimates for 1996.

Source: As mentioned in this table's notes

The first term of the right hand of equation 7.1 indicates the contribution of changing rural poverty incidence. The second term indicates the contribution of changing urban poverty incidence, and the last term is the contribution of population shift. The results of the decomposition calculation are reported in Table 7.9.

Table 7.9: Decomposition of HCI changes by urban and rural areas

Component of poverty changes	1987-90		1990-93		1993-96		1996-99		1999-02	
	Δ HCI	%	Δ HCI	%	Δ HCI	%	Δ HCI	%	Δ HCI	%
Urban	0.5	-15.0	-1.7	29.7	-0.6	10.9	3.8	35.9	-2.6	48.1
Rural	-2.9	96.4	-3.6	63.5	-4.9	82.3	7.2	67.8	-2.2	40.2
Population shift	-0.6	18.6	-0.4	6.9	-0.4	6.8	-0.4	-3.6	-0.6	11.7
INDONESIA	-3.0	100.0	-5.7	100.0	-5.9	100.0	10.6	100.0	-5.4	100.0

Notes: The decomposition uses equation 7.1 and excludes AMP in all years

Source: Author's estimates

With a substantially large share of rural population to the total Indonesian population, it is not surprising that the contribution of rural areas to the total decline (increase during the crisis period) in poverty was very large, except for the decline in poverty between 1999 and 2002 when the rural contribution was lower than for urban areas. The biggest rural contribution to the decline in total poverty was in 1990 when urban poverty increased. The rural contribution was 96 per cent compared to a negative urban 15 per cent. The low rural contribution to change poverty between 1999 and 2002 could be because the rural population share had declined to only 56 per cent by 2002.

Population shift contributed positively to the overall decline in poverty. As can be seen from Table 7.9, the declining poverty incidence before the crisis can be accounted for partly by this shift and the contribution was substantial, although much smaller than the contribution of declining rural poverty incidence. In the crisis period, the population shift contributed to lessening the jump in total poverty by a negative 3.6 per cent of the total change. As poor people are concentrated in rural areas, a decline in the proportion of the population living in rural areas always reduces the total poverty rate, in an accounting sense. Therefore, when total poverty jumped between 1996 and 1999, the contribution of the population shift to the poverty change was in reducing the sharp rise in national poverty incidence.

7.6.2. Across islands: evidence from the cumulative distribution of per capita expenditure

This section explores the distribution of poverty by main islands. The analysis is based on the cumulative distribution (CD) of real per capita expenditure as in Figure 7.1. The CD by islands for 1987 to 2002 is shown in Appendix 7.6. The method of estimating and interpreting the CD is the same as in Figure 7.1.

Poverty has been consistently concentrated in the Eastern Indonesian islands, especially Nusa Tenggara, Maluku, and Papua, followed by Sulawesi. No matter which poverty lines are used, poverty incidence is higher here than elsewhere. The CD for these islands has always been above the CD for all other Indonesian islands. This feature holds for almost all years under analysis, with the exception of 1999 when the CD for Java was just above the CD for Sulawesi and of 1987 when the CD for Kalimantan crossed with the CD for Sulawesi at the per capita expenditure of roughly Rp 110 thousand.

7.6.3. Across islands and provinces: evidence from acute poverty incidence

7.6.3.1. Across islands

Using the acute poverty line, 54 per cent to 63 per cent of the poor lived in Java and Bali over the period 1987 to 2002 (Table 7.10, middle section). The next largest percentage of poor (14 per cent - 19 per cent) lived in Sumatra, but this merely reflects the fact that population is concentrated in these islands (Table 7.10, bottom section).

The contribution of declining (increasing) poverty incidence in Java and Bali, as well as in Sumatra, has been large. For example, as can be seen from Table 7.11, the contribution of Java and Bali to Indonesia's total poverty decline from 1987 to 1990 was 44 per cent, followed by Sumatra with 16 per cent. This overall pattern held over the crisis period when Indonesia's poverty incidence jumped. Of this, Java, Bali and Sumatra contributed 87 per cent. Since these islands are the most populated in Indonesia as mentioned in the previous table, this pattern is not particularly surprising.

Table 7.10: HCI estimates, distribution of the poor, and distribution of the population by main islands (urban/rural areas) (%)

	1987			1996			1999			2002		
Main islands	U	R	U+R	U	R	U+R	U	R	U+R	U	R	U+R
HCI (%)												
Sumatra	6.4	24.2	20.0	2.3	11.3	8.6	8.3	18.9	15.5	6.8	22.7	17.0
Java and Bali	11.2	32.8	25.9	6.0	15.1	11.3	17.3	30.4	24.4	9.5	21.9	15.6
Nusa Tenggara	28.0	61.0	56.6	15.4	42.4	38.0	24.8	51.4	47.0	26.3	51.4	44.5
Kalimantan	13.7	40.9	33.9	3.8	16.1	12.3	5.6	17.3	13.6	5.6	16.8	12.8
Sulawesi	12.5	39.6	34.2	6.0	23.2	18.6	14.9	29.9	25.5	7.2	32.6	25.4
Maluku and Papua	15.4	71.7	60.8	6.4	43.1	33.9	21.3	69.7	56.6	- [c]	- [c]	- [c]
INDONESIA	10.9	34.0	27.5	5.4	16.9	12.8	15.3	28.9	23.5	9.2	24.3	17.6
Distribution of the poor (%)												
Sumatra	1.1 [a]	13.5 [a]	14.6 [a]	1.1	13.1	14.3	2.4	11.5	13.9	2.8	16.6	19.3
Java and Bali	8.1	50.6	58.7	11.8	41.8	53.6	20.2	42.5	62.7	17.2	38.3	55.5
Nusa Tenggara	0.5	7.2	7.7	0.7	10.3	11.1	0.7	6.8	7.5	1.6	8.4	10.1
Kalimantan	0.6	5.5	6.1	0.5	4.7	5.2	0.4	2.7	3.2	0.7	3.5	4.2
Sulawesi	0.6	8.1	8.8	0.9	9.5	10.3	1.3	6.4	7.7	0.9	10.0	10.9
Maluku and Papua	0.2	4.0	4.2	0.3	5.3	5.5	0.5	4.5	5.0	- [c]	- [c]	- [c]
INDONESIA	11.2	88.8	100.0	15.3	84.7	100.0	25.5	74.5	100.0	23.1	76.9	100.0
Distribution of the population (%)												
Sumatra	4.7 [b]	15.3 [b]	20.1 [b]	6.2	14.8	21.1	6.9	14.3	21.2	7.4	13.8	21.1
Java and Bali	19.9	42.4	62.3	25.2	35.4	60.6	27.5	32.9	60.4	30.7	29.5	60.2
Nusa Tenggara	0.5	3.2	3.7	0.6	3.1	3.7	0.6	3.1	3.8	1.0	2.8	3.8
Kalimantan	1.3	3.7	5.0	1.7	3.8	5.4	1.8	3.7	5.5	2.0	3.5	5.6
Sulawesi	1.4	5.6	7.1	1.9	5.2	7.1	2.1	5.0	7.1	2.1	5.2	7.3
Maluku and Papua	0.4	1.5	1.9	0.5	1.6	2.1	0.6	1.5	2.1	0.5	1.5	2.0
INDONESIA	28.2	71.8	100.0	36.1	63.9	100.0	39.4	60.6	100.0	43.7	56.3	100.0

Notes:

a) That is, for example, 1.1 per cent of the total Indonesian poor in 1987 lived in urban Sumatra and 13.5 per cent in rural Sumatra, so that 14.6 per cent of the poor lived in Sumatra Island.

b) That is, for example, 4.7 per cent of the total Indonesian population in 1987 lived in urban Sumatra and 15.3 per cent lived in rural Sumatra, so that 20.1 per cent of the total Indonesian population in 1987 lived in Sumatra Island.

c) Data are not available

Source: Author's estimates

Table 7.11: Decomposition of HCI changes by islands

Component of changes [a)]	1987-90		1990-93		1993-96		1996-99		1999-02 [b)]	
	Δ HCI	%	Δ HCI	%	Δ HCI	%	Δ HCI	%	Δ HCI	%
Sumatra	-0.5	15.6	-0.4	7.0	-1.4	25.1	1.4	13.4	0.3	-5.8
Java and Bali	-1.5	44.4	-4.2	73.5	-3.3	57.7	8.0	73.9	-5.6	103.4
Nusa Tenggara	-0.2	7.0	-0.4	6.3	-0.1	1.8	0.3	3.1	-0.1	1.8
Kalimantan	-0.4	12.9	-0.3	5.7	-0.4	6.5	0.1	0.6	0.0	0.8
Sulawesi	-0.4	11.2	-0.3	5.1	-0.4	7.6	0.5	4.5	0.0	0.1
Maluku and Papua	-0.3	8.7	-0.1	2.5	-0.1	1.7	0.5	4.4	-	-
Population shift [c)]	0.00	0.1	0.01	-0.1	0.02	-0.3	0.00	.0	0.02	-0.3
INDONESIA	-3.3	100.0	-5.7	100.0	-5.7	100.0	10.8	100.0	-5.4	100.0

Notes:

a) The decomposition starts from the following equation, which is analogous to equation A7.1 of Appendix 7.5:

$h_t = \sum_i w_t^i h_t^i$, and $\sum_i w_t^i = 1$; where h and t each is as defined in equation A7.1, w denotes the proportion of population in each main island, i. Using the same process of derivation, the decomposition into contribution of changing each main island and population shift is:

$$h_t^i - h_{t-3}^i = \sum_i \left(\frac{w_t^i + w_{t-3}^i}{2} \right)(h_t^i - h_{t-3}^i) + \sum_i \left(\frac{h_t^i + h_{t-3}^i}{2} \right)(w_t^i - w_{t-3}^i)$$

b) HCI in this year excludes the AMP.

c) Population shift here refers to the change in the proportion of population living in the island listed in the table to the total Indonesian population.

Source: Author's estimates

7.6.3.2. Across provinces

Poverty incidence is one of the development indicators in each province and one of the most important issues regarding the distribution of the poor could be related to poverty incidence across provinces giving some insight into development levels. Table 7.12

shows the total poverty incidence in each province from 1987 to 2002. For ease of comparison with the official estimates, provinces are ranked in descending order of total poverty incidence in 1996, since there were no official provincial level estimates in 1987 and no UCPL estimates for Aceh, Maluku, and Papua provinces in 2002.

Most of the provinces with high poverty incidence were located in Eastern Indonesia. As can be seen in Table 7.12, ten out of 12 provinces with a total poverty incidence higher than the national level in 1996 were located in Eastern Indonesia with the highest of these being East Nusa Tenggara, Papua, Maluku, and South East Sulawesi. The other two were the Western Indonesian provinces, of Lampung and Central Java.

On the other hand, most provinces with the lowest poverty incidence in 1996 were located in Western Indonesia. Jakarta was lowest with a poverty incidence of less than one per cent of the provincial population, followed by South Kalimantan, Jambi, and West Sumatra. Only two Eastern Indonesia provinces indicated a low poverty incidence and both are in Kalimantan Island: South Kalimantan and East Kalimantan province.

Table 7.12: The HCI based on UCPL estimates by provinces: 1987-2002 (%)

Province [a]	1987	1990	1993	1996	1999	2002
E Nusa Tenggara	69.8	66.7	57.6	58.2	63.7	59.2
Papua	60.5	45.5	38.6	33.9	58.1	- [b]
Maluku	61.0	46.1	38.6	33.9	55.2	- [b]
S E Sulawesi	53.1	45.4	33.3	27.3	36.9	31.8
C Kalimantan	63.8	47.6	37.0	22.2	18.1	21.1
N Sulawesi	32.3	26.0	22.4	20.9	29.2	29.0
W Kalimantan	45.8	34.9	29.3	19.5	13.8	15.9
Lampung [*]	31.3	30.8	27.3	18.2	24.0	25.7
W Nusa Tenggara	43.7	34.6	24.3	18.1	30.6	30.5
C Sulawesi	30.2	32.9	25.9	17.6	27.6	25.3
S Sulawesi	32.3	25.9	23.6	16.3	21.2	22.7
C Java [*]	34.4	32.4	25.1	14.0	26.6	19.7
E Java	23.8	20.9	15.4	12.4	27.9	18.6
W Java	26.4	24.6	15.9	11.5	26.4	14.0
Bengkulu	17.1	21.0	22.3	11.4	16.8	25.2
S Sumatra	21.1	21.9	23.0	9.8	18.1	21.4
Aceh	18.5	13.2	6.7	7.3	15.9	- [b]
Yogyakarta	20.4	21.1	7.3	7.2	17.4	13.8
N Sumatra	16.8	12.6	11.1	6.5	14.9	19.0
E Kalimantan [**]	19.3	16.1	7.4	6.4	14.9	4.3
Riau	19.6	9.1	7.3	6.3	5.5	5.3
Bali	33.3	19.8	14.6	5.1	8.8	4.1
W Sumatra	15.3	17.0	12.4	3.0	7.2	6.1
Jambi	13.8	8.5	9.8	2.9	16.7	7.8
S Kalimantan [**]	13.9	9.0	6.1	2.5	9.6	10.4
Jakarta	0.7	1.0	0.8	0.7	3.3	0.9
INDONESIA [c]	***27.5***	***24.2***	***18.5***	***12.8***	***23.5***	***17.6***

Notes:

a) Provinces are ranked in descending order of total poverty incidence in 1996. All provinces in the top part of this table are located in Eastern Indonesia, except for the two provinces with * symbol. Conversely, all provinces in the bottom part are located in Western Indonesia, except for those indicated by **. The border between the top and the bottom part is the national average of poverty incidence in 1996 (i.e., 12.8).

b) Data are not available.

c) Population weighted average

Sources: Author estimates

Provinces have been ranked by poverty incidence in each Susenas year. The rankings in 1987, 1990, and so forth up until 2002 (see Figure 7.6) were not much different. For example, five of the ten poorest provinces in 1987 were still in the category of the ten poorest provinces in 1999. These provinces were East and West Nusa Tenggara, Maluku, Papua, and South East Sulawesi.[15] These provinces were consistently in the category of the ten poorest provinces during each of the six Susenas years from 1987 to 2002. Central Java - the poorest province in Java – was in the same category four times, but not in consecutive survey years.

The lack of difference between provincial ranks by poverty incidence can also be seen from the lowest poverty incidence. Seven of the ten provinces with the lowest poverty incidence in 1987 were in the same category in 2002. These were Jakarta, Jambi, South Kalimantan, West Sumatra, Riau, East Kalimantan, and Yogyakarta. With the exception of Yogyakarta in 1999, all these provinces were consistently in the lowest category in each of the six Susenas years from 1987 to 2002. Aceh and North Sumatra were consistently in the same category in all surveys, except for the last survey of 2002.

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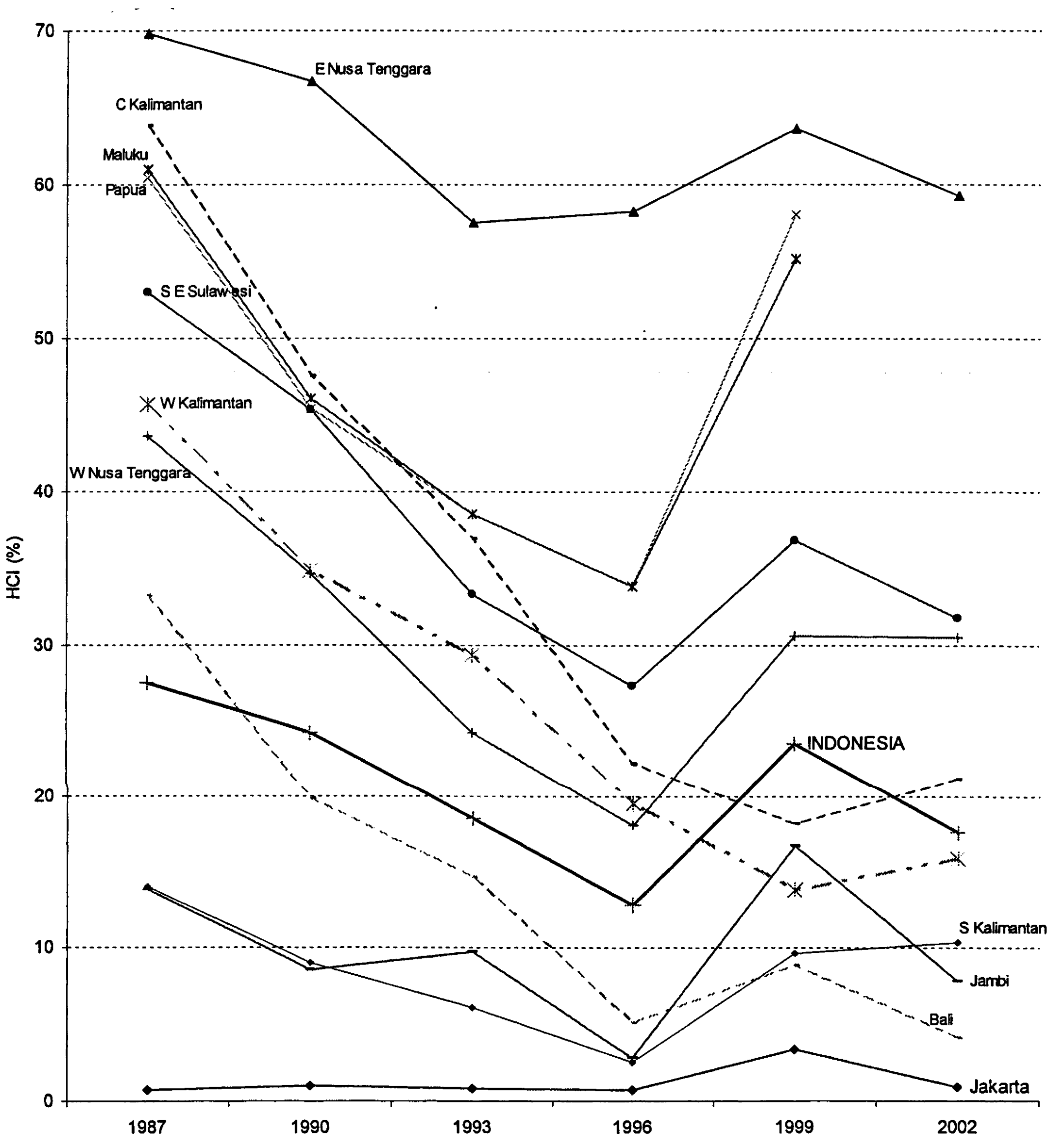
[15] There was no data on Papua and Maluku in 2002, however, it most likely these two provinces were still among the poorest provinces. The official poverty incidence estimates for 2002 also indicated these two provinces as the poorest in Indonesia (BPS 2003c, Table 3.9).

Figure 7.6: The evolution of HCI over time for selected provinces from 1987 to 2002 (%)



Notes: The bold line indicates the national HCI (Indonesia, i.e., average HCI across provinces). Dashed lines indicate HCI for provinces that are crossing the national HCI. Papua and Maluku provinces had no data in 2002.

Source: Table 7.12

Amid the lack of changes in the rankings of provinces by the HCI, some provinces managed to improve their rankings, i.e., Bali, Central and West Kalimantan. Bali was relatively poor in 1987, but managed to reduce poverty incidence by 1990 to the degree where it was ranked as one of the ten provinces with the lowest poverty incidence in the subsequent survey. Bali has been in the lowest 10 rankings ever since. Likewise, Central and West Kalimantan managed to substantially slash poverty incidence. These two provinces were in the highest ten poverty incidence provinces in 1987.

The lack of changes in the rankings for poverty incidence amongst provinces is also supported by the coefficient of Spearman rank correlations. The correlation between poverty incidence across provinces in 1987 with 2002 was 0.72 (n=45) and significant at the 1 per cent level (Table 7.13). The coefficient is much lower but the significance level does not change much for urban and rural areas. The correlation for urban only areas was 0.52 (n=23) and for rural only was 0.46 (n=22). They are significant at the level of 1 per cent and 5 per cent, respectively. Likewise, as can be seen from the table, the same correlations between 1987 and any other years were also high and significant.

The lack of changes in the provincial poverty ranking seems consistent with the provincial economic growth literature in Indonesia. During the period 1975 to 1993, the disparities of income per capita across provinces tended to fall, but the regions at the top and bottom of the distribution in 1983 remained the same as in 1993 (Garcia and Soelistianingsih 1998).

Table 7.13: The Spearman rank correlation of UCPL-based HCI across provinces between one and other Susenas years, and between UCPL-based HCI and other estimates

		UCPL						BPS					Pradhan et al.		Bidani& Ravallion
		2002	1999	1996	1993	1990	1987	2002	1999	1996	1993	1990	1999	1996	1990
Overall		n=45	n=51	n=51	n=51	n=51	n=51	n=45	n=51	n=51	n=51	n=35	n=51	n=51	n=50
UCPL [a)]	2002	1						0.72*							
	1999	0.81 *	1						0.78*				0.87 *		
	1996	0.85 *	0.80 *	1						0.47*				0.80 *	
	1993	0.82 *	0.73 *	0.90 *	1						0.41**				
	1990	0.78 *	0.71 *	0.90 *	0.92 *	1						0.11			0.89 *
	1987	0.72 *	0.68 *	0.86 *	0.89 *	0.93 *	1								
Urban Only		n=23	n=26	n=26	n=26	n=26	n=26	n=23	n=26	n=26	n=26	n=18	n=26	n=26	n=26
UCPL	2002	1						0.71 *							
	1999	0.64 *	1						0.67 *				0.79 *		
	1996	0.80 *	0.62 *	1						0.27				0.64 *	
	1993	0.81 *	0.62 *	0.89 *	1						0.49**				
	1990	0.62 *	0.48 **	0.84 *	0.84 *	1						0.58**			0.80 *
	1987	0.52 *	0.44**	0.73 *	0.72 *	0.86 *	1								
Rural only		n=22	n=25	n=25	n=25	n=25	n=25	n=22	n=25	n=25	n=25	n=17	n=24	n=25	n=24
UCPL	2002	1						0.68*							
	1999	0.72 *	1						0.80*				0.81 *		
	1996	0.72 *	0.73 *	1						0.40**				0.78 *	
	1993	0.60 *	0.52 *	0.85 *	1						0.32				
	1990	0.65 *	0.67*	0.90 *	0.88 *	1						0.17			0.86 *
	1987	0.46 **	0.57*	0.86 *	0.81 *	0.89 *	1								

Notes:

*; **; and *** indicates the significance level of 1%, 5%, and 10%, respectively.

a) Number of observations in the UCPL for all years is 26 in urban and 25 in rural a total of 51, except in 2002, where n=23 in urban and n=25 in rural

Source: Author's estimates

The comparisons of ranking provinces by poverty incidence based on the UCPL with BPS, and with other estimates are as follows. With the BPS estimates generally, there was not a large difference between the ranking of provinces based on either the UCPL or the official method (Table 7.13). The largest differences in rankings were in 1990 and 1993. The Spearman rank correlation between the 1990 UCPL estimates and 1990 official estimates was not significant at the level of 10 per cent in the combined urban and rural areas and only significant in urban areas at the level of 5 per cent. The correlation between the two estimates in 1993 was not significant in rural areas at the level of 10 per cent. As mentioned in Section 3.4.1 of Chapter 3, BPS used the Food Energy Intake (FEI) method to estimate the food poverty line in each Susenas year, but in earlier Susenas years until 1990 the FEI was applied using all Susenas food items before using some selected food items in 1993. In 1993, the poverty line was estimated using food share method.

Turning to comparisons with other researchers' estimates, the ranking of provinces based on the UCPL is very similar to the estimates in other studies. The Spearman rank correlations between the UCPL estimates and the estimates of Pradhan et al. in both 1996 and 1999 were positive and significant at the level of 1%. This holds true for whatever areas is used in the estimation in urban only, rural only, or both. Likewise, the correlations between the UCPL and Bidani and Ravallion estimates in 1990 were significant at the level of 1% in all areas (Table 7.13).

7.7. Summary and Conclusions

The *direction* of poverty change is as follows. The long-term trend in poverty during the 15 years from 1987 to 2002 has definitely been a decline. Poverty in 1987 was much higher than in 2002 for all possible poverty lines used in the measurements. On the one hand, the official estimates for these years have been based on five different methodologies for measuring poverty lines and therefore the *magnitude* of the changes in officially measured poverty incidence was a combination of the genuine decline in poverty incidence and the results of these changing methodologies. On the other hand, the other non-official estimates that applied a similar methodology were only for one year or two adjacent years. Therefore, it was hardly possible to have reliable estimates on the long-term trends in poverty incidence from the previous studies. The application of a single and consistent method of poverty measurement in this thesis has sought to resolve this issue.

In the long-term, the most outstanding difference between acute poverty incidence based on the UCPL approach and the official 'consistent' estimates is the fall and rise in poverty incidence over time. The fall and the rise in the former have been sharper than the trend based on the official estimates. The UCPL shows acute poverty incidence from 1987 to 1996 (pre-crisis period) declined by more than half. In contrast, official estimates of the fall in poverty incidence have been much smaller. The UCPL approach shows poverty incidence from 1996 to 1999 almost doubled. In contrast, the official method shows poverty incidence increased by less than half. So, the UCPL approach implies the official estimates underestimate both the declining rate during the pre crisis period and the rising rate during the crisis period.

The fall and rise in mild poverty incidence was in the same direction as for acute incidence, but at a lower level of magnitude. Note that the mild poverty line was set 50 per cent higher than the acute poverty line. Nevertheless, mild poverty incidence was higher by more than double in every Susenas year compared with the acute poverty incidence. The fall in the period 1987-1996 and the rise during the crisis of mild poverty was not as large as for acute poverty.

In the short-term, between 1987 and 1996, besides official data, previous studies have indicated inconclusive trends. This thesis shows poverty declined steadily and very substantially between 1987 and 1996. The crisis that hit in 1997 reversed the Indonesian success story in poverty alleviation putting poverty in 1999 back to the 1990 level, or at least to a level somewhere before 1993. By 2002, poverty had again declined, but had not returned to the 1996 level. Poverty in 2002 was still well above that of 1996. This conclusion is robust whatever SCOLI is used in the estimation of poverty lines.

The *magnitude* of the poverty changes are follows. In the short-term, acute poverty has steadily and markedly declined from 27.0 per cent of the total population in 1987 to only 12.4 per cent in 1996, a drop of more than half. Looking at urban and rural areas, this decline was roughly equal in both areas. This steady and marked decline in poverty was confirmed by the mild poverty incidence. By the mild poverty line, almost 60 per cent of the Indonesian population in 1987 was poor and this proportion had fallen to 41 per cent by 1996. These figures change by a few percentage points if the SCOLI-B index is used to estimate the UCPL. Nevertheless, this does not invalidate the conclusion that poverty steadily and markedly declined between 1987 and 1996.

In the crisis period, acute poverty almost doubled from 12.4 per cent in 1996 to 23 per cent by 1999, and mild poverty jumped from 41.1 to 57.3 per cent. By 2002, poverty had declined, but only to the level of 1993. This contrasts with the official figures that indicate poverty incidence in 2002 was roughly at the 1996 level.

Over the period of the crisis, the rise and fall in poverty was sharper in urban than in rural households for most sectors; and the rise and fall in poverty was sharper in households working in non-agricultural sectors than in the agriculture.

With regard to monitoring poverty, relative poverty cannot be used to indicate the change in poverty incidence over time. The direction of poverty based on relative poverty contrasted with poverty based on absolute poverty. While absolute poverty steadily and remarkably declined, relative poverty indicates otherwise; and while the absolute poverty jumped in the crisis period, relative poverty indicates a decrease in poverty and even indicates poverty reaching its lowest points! During the fifteen years from 1987 to 2002, relative poverty has followed exactly the same pattern as the Gini coefficients. This reinforces the notion that relative poverty is an inequality measure rather than a poverty measure.

The fluctuation patterns of other poverty indices of poverty gap index (PGI) and severity of poverty index (SPI) confirm the direction of the change in poverty based on HCI. From the point of view of the PGI, it is revealed that the average expenditure of the poor was not far below the poverty line. The highest PGI was in 1987 at only 5.7 per cent and by 2002, it had declined to 3.2 per cent.

The urban-rural distribution of poverty is another difference between the UCPL approach and the official estimates. The UCPL shows acute poverty incidence in urban areas has been much lower than in rural areas. Even though the percentage of urban poor has fluctuated over time, urban poverty incidence has always been far below rural poverty incidence. In contrast, the official figures show urban poverty was higher than rural poverty in the earlier Susenas years up to 1990, more or less equal in 1993, and that urban poverty was lower than rural poverty in 1996 onwards. This different result between the two estimates is a direct effect of the difference in setting urban poverty lines in excess of rural poverty lines. On average, the UCPL sets the urban poverty line 13.3 per cent higher than the rural poverty line for all years, whereas BPS sets the urban poverty line at least 24 per cent higher. It is argued in Chapter 4 that BPS has greatly overestimated the U-R COL gap. This conclusion is in line with the findings of all other researchers. Over time, the U-R COL gap implied by the BPS official poverty lines has declined very substantially. This appears to be partly recognition by BPS that their estimated gap was much too high. However, the gradual reduction of this excessive gap means that the BPS estimates of urban and rural poverty are not comparable over time. By reducing the excessive U-R COL gap, BPS has overstated the decline in urban poverty, relative to the decline in rural poverty. The estimates reported here provide a consistent methodology for estimating the declines in both urban and rural poverty.

The proportion of Indonesia's poor living in urban areas increased rapidly over this period, but is still quite low compared to the official estimates. It was quite small at only 11 per cent of total poor in 1987. It doubled to 23 per cent by 2002, but the proportion of urban poor was still smaller than the official estimates.

The contribution of rural areas to declining poverty was large, with the exception of the poverty decline between 1999 and 2002. The largest rural contribution to declining poverty was between 1987 and 1990, i.e., 96 per cent, when urban poverty incidence actually increased. In the period 1999 to 2002 the rural contribution to declining poverty was equal to the contribution of urban areas. In part, this occurred because the share of rural population was the least compared to previous years.

With regard to distribution across islands, poverty incidence has always been relatively high in the Eastern Indonesian islands, especially Nusa Tenggara, Maluku, and Papua, followed by Sulawesi. These three islands have always been in the highest poverty ranking during the 15 years period of analysis, with the exception of 1999, when Java became the third highest poverty incidence island and 1987 when acute poverty in Kalimantan and Sulawesi were roughly at the same levels. Therefore, it is not surprising that most provinces with high poverty incidence were located in Eastern Indonesia. In 1996, ten out of 12 provinces with total poverty incidence higher than the national level were located in Eastern Indonesia, whereas most of those provinces with the lowest poverty incidence were located in Western Indonesia. This feature did not change much during the period 1987 to 2002. That is, the ranking of provinces by total poverty incidence in 1987 was not much different to the 2002 ranking - the latest year of

Susenas data. Spearman rank correlation coefficient of provinces by total poverty incidence between one year and any other shows very high correlations. For example, the correlation between poverty incidence across provinces in 1987 and in 2002 was 0.72 (n=46) and is significant at the 1 per cent level.

Appendix 7.1: Poverty incidence from 1987 to 2002 including Aceh, Maluku, and Papua

Table A7.1: The total percentage and number of people below poverty lines (including Aceh, Maluku, and Papua)

Year	UCPL (Acute poverty)		BPS		Others
	SCOLI-A	SCOLI-B	Pre-crisis	Post-crisis	
	HCI (%)				
1987	27.5	32.4	17.3	-	16.5 [c)]
1990	24.2	31.5	15.1	-	19.6 [d)]
1993	18.5	21.5	13.7	-	-
1996	12.8	16.0	11.3	17.5	15.5 [e)]
1999	23.5	23.1	-	23.4	26.9 [e)]
2002 *)	17.6	17.6	-	18.2	-
	Million people				
1987	45.9	54.2	28.9	-	27.5 [c)]
1990	43.2	56.2	26.9	-	35.1 [d)]
1993	34.4	39.9	25.4	-	-
1996	24.8	31.1	22.1	34.0	30.8 [e)]
1999	48.2	47.3	-	48.0	55.1 [e)]
2002 *)	17.6	35.7	-	38.4	-

*) exclude AMP and other notes are as for Table 7.2a

Source: As for Table 7.2a

Appendix 7.2: Estimated 'consistent' official poverty incidence

Table A7.2: Official HCI and estimated 'consistent' HCI for the years before and after crisis

Year	BPS [a]		Adjustment Factor	Estimated 'consistent' official HCI [c]	
	Pre-crisis method	Post-crisis method		Pre-crisis method	Post-crisis method
1987	17.3	-		17.3	26.7*
1990	15.0	-		15.0	23.1*
1993	13.4	-		13.4	20.6*
1996	11.2	17.5	1.55 [b]	11.2	17.5
1999	-	23.0		14.9**	23.0
2002	-	17.6		11.4**	17.6

Notes:

a) Figures in this column are rewritten from Table 7.2a column total (BPS).

b) This adjustment factor is the ratio of the revised BPS HCI estimate to the old estimate for 1996 (including AMP, i.e., 17.5 divide by 11.3).

c) To get roughly consistent estimates for the entire period, all BPS estimates before 1996 were multiplied by the adjustment factor to get consistent estimates based on the post crisis method (cells with * symbol), which are shown in the post crisis method column. Likewise, all BPS estimates post 1996 were divided by the adjustment factor to get roughly consistent estimates based on the pre crisis method (cells with ** symbol), which are shown in the BPS pre crisis method column.

Source: Recalculated from BPS HCI in Table 7.2a

Appendix 7.3: Discrepancies in the number of the poor across regions between UCPL estimates and revised official estimates

Table A7.3: The discrepancies between the UCPL and official estimates in 1996

Province	Number of the poor (000 people)						Discrepancies (UCPL estimates minus official estimates)		
	UCPL estimates			Revised official estimates					
	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
SUMATRA	***278***	***3265***	***3543***	***1542***	***4804***	***6346***	***-1264***	***-1539***	***-2803***
Aceh	22	259	281	58	434	492	-36	-175	-211
N Sumatra	78	651	729	559	917	1476	-481	-266	-746
W Sumatra	11	117	129	103	324	426	-91	-207	-298
Riau	29	219	248	85	412	497	-56	-192	-249
Jambi	10	58	68	134	220	355	-124	-162	-286
S Sumatra	33	677	710	266	886	1151	-232	-209	-441
Bengkulu	18	144	162	84	153	237	-66	-9	-75
Lampung	76	1140	1216	254	1458	1712	-178	-318	-496
JAVA AND BALI	***2926***	***10379***	***13305***	***6810***	***12450***	***19044***	***-3885***	***-2071***	***-5956***
Jakarta	63	-	63	216	-	216	-152	-	153
W Java	1386	3142	4528	1993	2366	4359	-607	776	170
C Java	521	3637	4158	1973	4444	6418	-1453	-807	-2260
Yogyakarta	64	147	211	286	251	538	-223	-104	-327
E Java	842	3355	4197	2255	5249	7503	-1413	-1893	-3306
Bali	50	97	147	87	140	227	-37	-43	-80
NUSA TENGGARA	***183***	***2568***	***2752***	***355***	***2210***	***2564***	***-171***	***358***	***187***
W Nusa Tenggara	59	603	662	224	946	1169	-165	-343	-508
E Nusa Tenggara	125	1965	2090	131	1264	1395	-6	701	695
KALIMANTAN	**122**	**1180**	**1302**	**219**	**1364**	**1583**	**-97**	**-184**	**-281**
W Kalimantan	45	668	713	70	816	886	-24	-148	-172
C Kalimantan	42	322	364	21	201	222	21	121	142
S Kalimantan	13	61	74	84	163	248	-71	-102	-174
E Kalimantan	22	129	150	44	184	228	-22	-55	-77
SULAWESI	***218***	***2349***	***2567***	***519***	***2128***	***2646***	***-300***	***221***	***-79***
N Sulawesi	36	517	554	85	391	476	-49	126	77
C Sulawesi	35	309	344	64	371	436	-29	-63	-92
S Sulawesi	105	1129	1234	316	953	1268	-211	177	-34
S E Sulawesi	42	394	436	53	413	466	-11	-19	-30
MALUKU & PAPUA	***65***	***1310***	***1375***	***141***	***1624***	***1765***	***-76***	***-314***	***-390***
Maluku	43	667	710	104	831	935	-61	-163	-225
Papua	23	643	665	37	794	830	-14	-151	-165
INDONESIA	***3793***	***21051***	***24843***	***9585***	***24579***	***34164***	***-5793***	***-3528***	***-9321***

Source: Author's estimates using the SCOLI-A and BPS (2000c, Tables 12.6 and 12.7)

Table A7.4: The discrepancies between the UCPL and official estimates in 1999

Province	Number of the poor (000 people)						Discrepancies (UCPL estimates minus official estimates)		
	UCPL estimates			Official estimates					
	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
SUMATRA	***1173***	***5548***	***6721***	***2601***	***5995***	***8596***	***-1429***	***-447***	***-1876***
Aceh	75	572	647	105	498	602	-29	75	45
N Sumatra	470	1286	1757	968	1004	1973	-498	282	-216
W Sumatra	70	258	327	237	364	602	-168	-107	-274
Riau	49	184	233	143	447	590	-93	-263	-356
Jambi	74	352	426	177	500	677	-103	-148	-251
S Sumatra	286	1110	1396	566	1247	1814	-280	-138	-418
Bengkulu	35	221	256	98	205	302	-63	17	-46
Lampung	113	1565	1678	307	1730	2037	-194	-165	-359
JAVA AND BALI	***9750***	***20475***	***30225***	***11336***	***17526***	***28482***	***-1586***	***2949***	***1363***
Jakarta	316		316	380			-63		63
W Java	4583	6622	11205	4279	4115	8394	304	2508	2811
C Java	1844	6334	8177	3032	5723	8755	-1188	610	-578
Yogyakarta	243	285	527	483	306	789	-240	-22	-262
E Java	2640	7094	9734	3048	7239	10286	-407	-145	-552
Bali	124	141	265	115	143	258	10	-3	7
NUSA TENGGARA	***318***	***3289***	***3608***	***396***	***2660***	***3056***	***-77***	***629***	***552***
W Nusa Tenggara	168	1016	1184	249	1028	1277	-82	-11	-93
E Nusa Tenggara	151	2273	2424	146	1633	1779	4	640	645
KALIMANTAN	***200***	***1320***	***1520***	***350***	***1878***	***2228***	***-150***	***-558***	***-708***
W Kalimantan	18	516	535	96	921	1016	-77	-404	-482
C Kalimantan	38	277	315	27	235	262	11	42	53
S Kalimantan	43	251	294	100	341	440	-57	-90	-147
E Kalimantan	101	275	376	128	381	509	-27	-106	-133
SULAWESI	***629***	***3084***	***3713***	***745***	***2327***	***3071***	***-115***	***758***	***642***
N Sulawesi	114	697	811	103	402	505	11	295	306
C Sulawesi	100	476	577	126	474	599	-25	3	-23
S Sulawesi	353	1342	1695	447	1015	1462	-94	327	233
S E Sulawesi	62	568	631	69	436	505	-6	132	126
MALUKU & PAPUA	***248***	***2185***	***2433***	***216***	***1946***	***2163***	***31***	***239***	***270***
Maluku	175	1039	1213	167	847	1014	8	191	200
Papua	73	1146	1219	50	1099	1149	23	47	71
INDONESIA	***12317***	***35902***	***48219***	***15643***	***32332***	***47975***	***-3325***	***3570***	***243***

Source: As for Table A7.3

Table A7.5 below reports a poverty line index for each urban and rural area in each province for 1996 to indicate the increase in poverty lines set by the UCPL and official estimate. The index in each region uses the 1999 poverty line as a base year (i.e., in each region, 1999 = 100). This is because both estimates came up with almost the same results of total HCI. By this calculation, the higher the index in a region, the lower the inflation rate implied by the poverty line in that region.

Between 1996 and 1999 the increase in poverty line based on the UCPL was higher on average than the increase in the official poverty line. The urban poverty line for 1996 based on the UCPL on the average across provinces was at the level of 39.2 per cent of the line for the same areas for 1999, while the official estimates for the same area was at 45.5 per cent of the line in 1999, or 6.3 percentage points higher than the UCPL. Likewise, across rural areas, the table also implies the inflation estimates used in the UCPL during that period were higher than the ones used for the official estimates.

Table A7.5: Discrepancies of the index of poverty line in each region for 1996 between UCPL estimates and official estimates (the index of poverty line in each region for 1999 =100)

Province	The index of poverty line for 1996				Discrepancies (Author's estimates minus official's estimates)	
	Author's estimates [a]		Official estimates			
	Urban	Rural	Urban	Rural	Urban	Rural
Aceh	38.5 [b]	38.5	44.9 [c]	43.5	-6.4	-5.0
N Sumatra	38.2	38.2	45.9	44.1	-7.7	-5.8
W Sumatra	39.1	39.1	47.8	43.6	-8.8	-4.6
Riau	45.3	45.3	46.3	43.7	-1.0	1.6
Jambi	39.2	39.2	45.9	44.7	-6.7	-5.5
S Sumatra	40.3	40.3	45.0	41.6	-4.7	-1.3
Bengkulu	42.2	42.2	43.4	44.6	-1.2	-2.4
Lampung	42.8	42.8	45.3	43.9	-2.4	-1.0
Jakarta	39.1	-	44.6	-	-5.5	-
W Java	39.6	39.6	45.7	42.2	-6.2	-2.6
C Java	39.2	39.2	45.3	42.2	-6.2	-3.1
Yogyakarta	38.2	38.2	44.4	41.1	-6.2	-2.9
E Java	37.2	37.2	45.4	41.0	-8.2	-3.9
Bali	38.4	38.4	44.8	40.9	-6.5	-2.5
W Nusa Tenggara	35.9	35.9	45.5	41.3	-9.6	-5.4
E Nusa Tenggara	44.9	44.9	46.1	43.1	-1.2	1.8
W Kalimantan	47.1	47.1	43.1	42.8	4.0	4.3
C Kalimantan	46.9	46.9	45.8	42.1	1.2	4.8
S Kalimantan	40.3	40.3	45.2	43.6	-4.9	-3.3
E Kalimantan	43.2	43.2	46.5	42.1	-3.3	1.1
N Sulawesi	34.9	34.9	46.1	41.6	-11.2	-6.7
C Sulawesi	41.3	41.3	44.7	43.4	-3.4	-2.1
S Sulawesi	38.0	38.0	45.5	43.1	-7.5	-5.1
S E Sulawesi	38.5	38.5	43.8	43.3	-5.3	-4.8
Maluku	35.8	35.8	45.8	44.3	-10.0	-8.5
Papua	35.8	35.8	45.5	41.4	-9.8	-5.6
INDONESIA	***39.2***	***39.2***	***45.5***	***42.2***	***-6.3***	***-3.1***

Notes:

a) As implied by SCOLI-A (Table 6.1 of Chapter 6).

b) For example, 38.5 means the poverty line for urban Aceh in 1996 was 38.5% of the poverty line for urban Aceh in 1999.

c) For example, 44.9 means the poverty line for urban Aceh in 1996 reported by BPS was 44.9% of the poverty line for urban Aceh in 1999.

Source: As for Table A7.3

Appendix 7.4: Absolute poverty, Relative poverty, and Gini coefficients

Table A7.6: Absolute poverty, Relative poverty, and Gini coefficients (1987-2002)

	Poverty incidence (%)				Inequality	
	Absolute poverty line		Relative poverty line		Gini coefficient	
Year	Acute: Rp 101.9	Mild: Rp 152.9	½ of median expenditure	¾ of median expenditure	Author's estimates	Official estimates
1987	27.0	59.5	5.7	27.3	0.31	0.32
1990	24.0	57.1	5.2	26.6	0.30	0.32
1993	18.3	50.0	5.3	26.8	0.32	0.34
1996	12.4	41.1	5.8	27.7	0.33	0.36
1999	23.0	57.3	4.3	25.5	0.30	0.31
2002	17.6	47.7	5.2	26.6	0.33	0.33

Notes: All poverty lines are in Rp thousand per capita per month. The median expenditure for each Susenas year from 1987 to 2002 was, respectively, Rp 136.4, Rp 140.4, Rp 153.2, Rp 171.9, Rp 140.5, and Rp 154.4 and was in Rp thousand per capita per months.

The Gini coefficient formula is estimated from a Lorenz curve, i.e., the area between the Lorenz and the diagonal line divided by the triangle area under the diagonal line, which by definition is 0.5. By dividing the area under the Lorenz curve into many 'trapezium' areas with the two parallel sides of each 'trapezium' vertical, the formula for the Gini coefficient can be written as: $G = 1 - \sum_{i=1}^{N} p_i (ce_{i-1} + ce_i)$,

where i is expenditure class, p is the percentage of population in expenditure class i, and ce is cumulative percentage of expenditure. The author has 20 expenditure classes, which implies 20 trapezium areas to estimate the Gini coefficient in each year. Each class has the same percentage of population.

Source: The author's estimates and BPS (1999, Table 6.2, p. 88; 2003c, Table 6.1, p.53)

Appendix 7.5: Derivation of the formula for decomposition of poverty incidence changes into different areas

The derivation of equation 7.1 in the main text to decompose the change in poverty incidence into urban and rural areas is as follows:

A7.1 $$h_t = w_t h_t^R + (1 - w_t) h_t^U,$$

where h_t is the HCI at year t; w_t is the proportion of rural population to the total population, and subscripts R and U indicate rural and urban, respectively.

A7.2 $$\frac{\partial h_t}{\partial t} = w_t \frac{\partial h_t^R}{\partial t} + (1 - w_t) \frac{\partial h_t^U}{\partial t} + (h_t^R - h_t^U) \frac{\partial w_t}{\partial t}$$

In each 3 year period approximately:

A7.3 $$\frac{\partial h_t}{\partial t} = \frac{h_t - h_{t-3}}{3}; \frac{\partial h_t^R}{\partial t} = \frac{h_t^R - h_{t-3}^R}{3}; \frac{\partial h_t^U}{\partial t} = \frac{h_t^U - h_{t-3}^U}{3}, \text{ and } \frac{\partial w_t^U}{\partial t} = \frac{w_t^U - w_{t-3}^U}{3}.$$

Substituting A7.3 into A7.2 and then crossing 3 out from denominator of both side of the equation, the formula used to decompose is:

A7.4 $$h_t - h_{t-3} = \left(\frac{w_t + w_{t-3}}{2}\right)(h_t^R - h_{t-3}^R) + \left(1 - \frac{w_t + w_{t-3}}{2}\right)(h_t^U - h_{t-3}^U)$$
$$+ \left(\frac{h_t^R + h_{t-3}^R - h_t^U - h_{t-3}^U}{2}\right)(w_t - w_{t-3})$$

Equation A7.4 is a preferred method to the formula used by Ravallion and Huppi (1991, p.63):

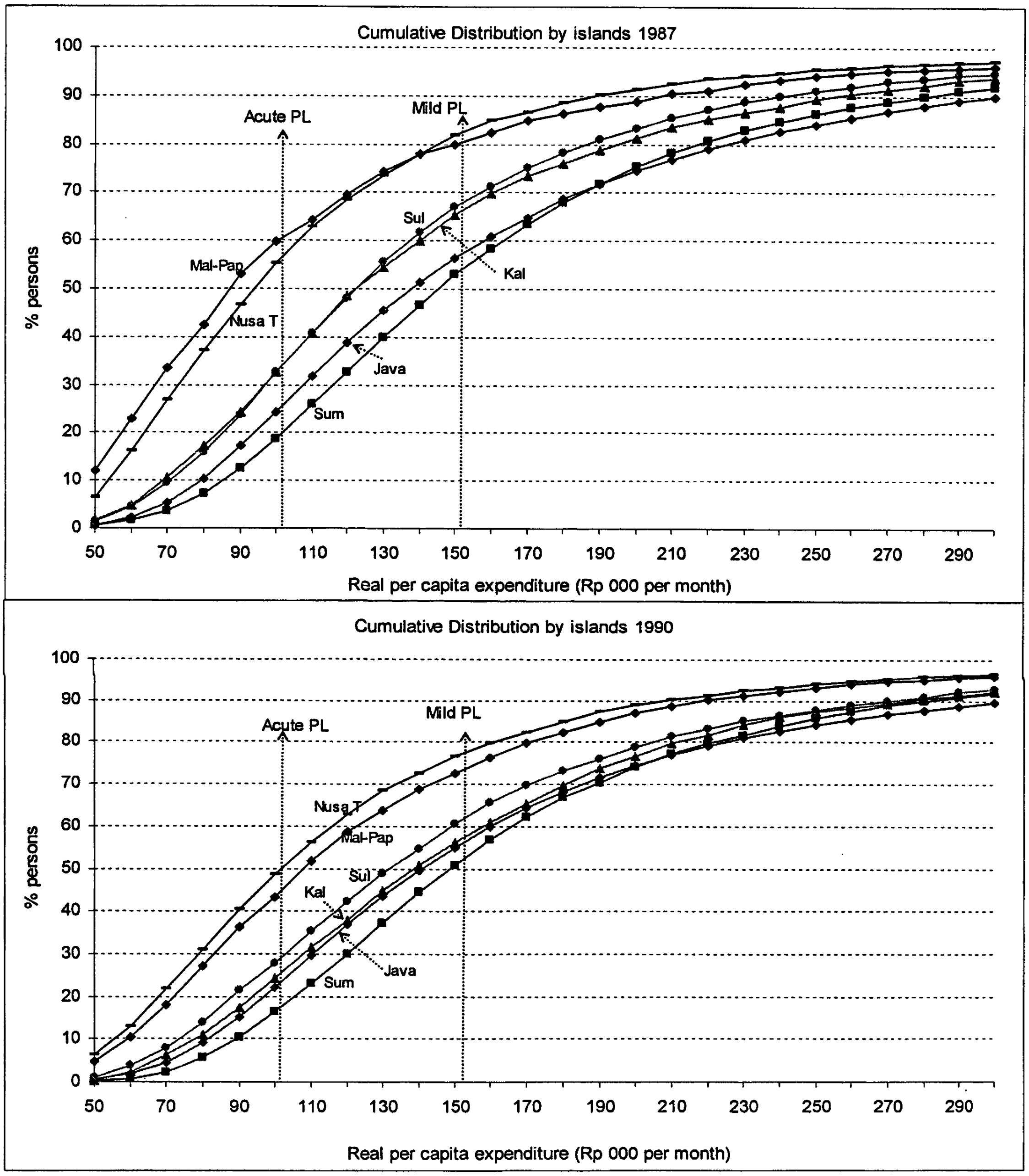
$$\text{A7.5} \quad h_t - h_{t-3} = \sum_r w_{t-3}^r (h_t^r - h_{t-3}^r) + \sum_r h_{t-3}^r (w_t^r - w_{t-3}^r) + \sum_r (h_t^r - h_{t-3}^r)(w_t^r - w_{t-3}^r) \ ,$$

where *h* is HCI, *w* is population share, *t* and *t-3* is the Susenas year and the previous Susenas year, *r* is an area defined as urban or rural. The first term in the right hand of the equation is the intra area effects of poverty changes. The second term is the change in poverty arising from population shifts. The last term is the residual effect.

Equation A7.4 is preferred to equation A7.5 because the decomposition can actually be made only into the change within each area (urban and rural areas) and the change in the proportion of population, without the residual effect as in the equation A7.5. Moreover, using the weights defined only in *t-3* (i.e., w_{t-3}^r and h_{t-3}^r) in the first term and the second term of the right side of the equation used by Ravallion and Huppi will sensitive to the value of the weights in year *t-3*.

Appendix 7.6: Cumulative distribution of acute poverty by islands (1987-2002)

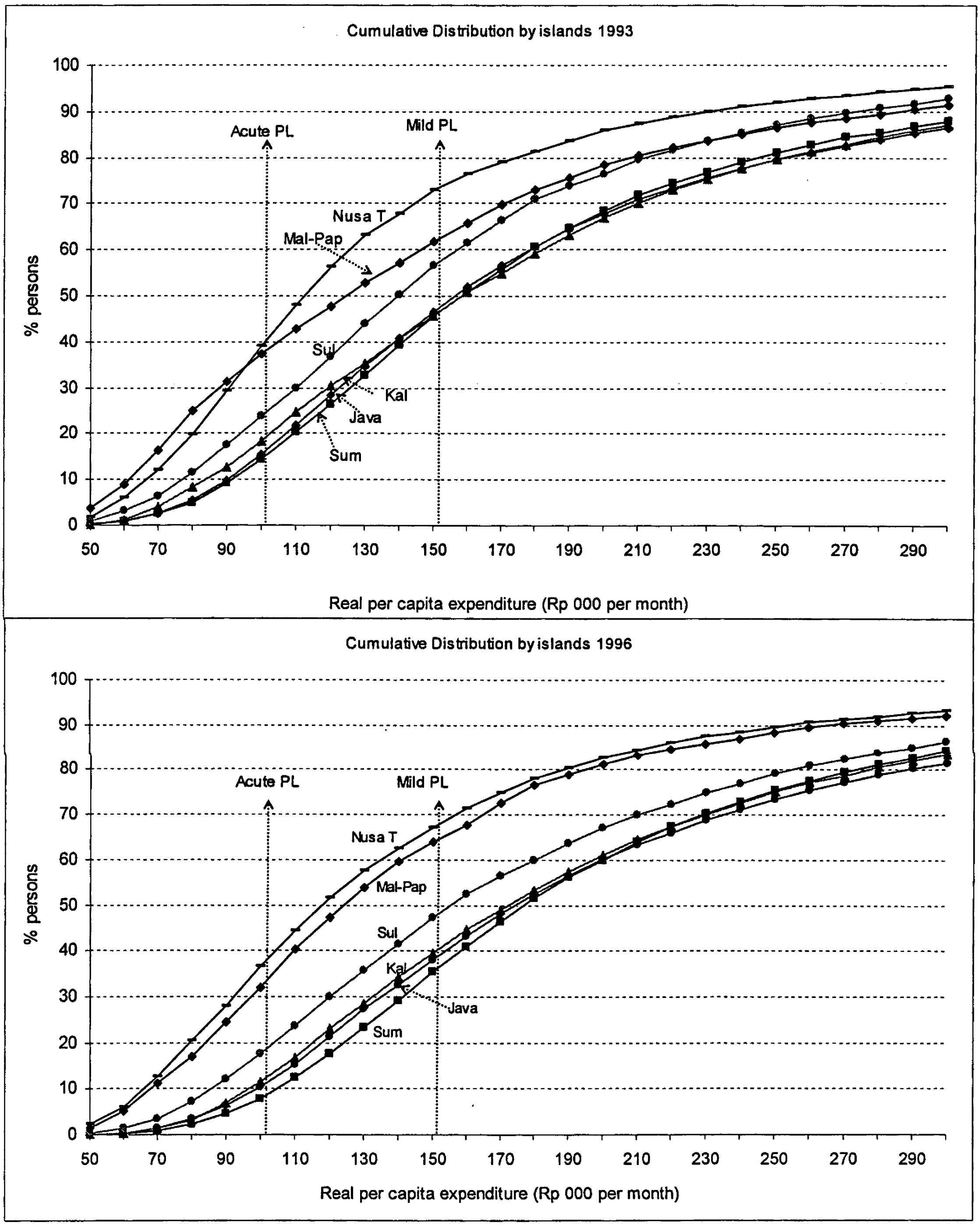
Figure A7.6a: Cumulative distribution of poverty by islands in 1987 and 1990.



Notes: Real expenditure is estimated as in notes for Figure 7.1 in the main text.

Source: Author's estimates

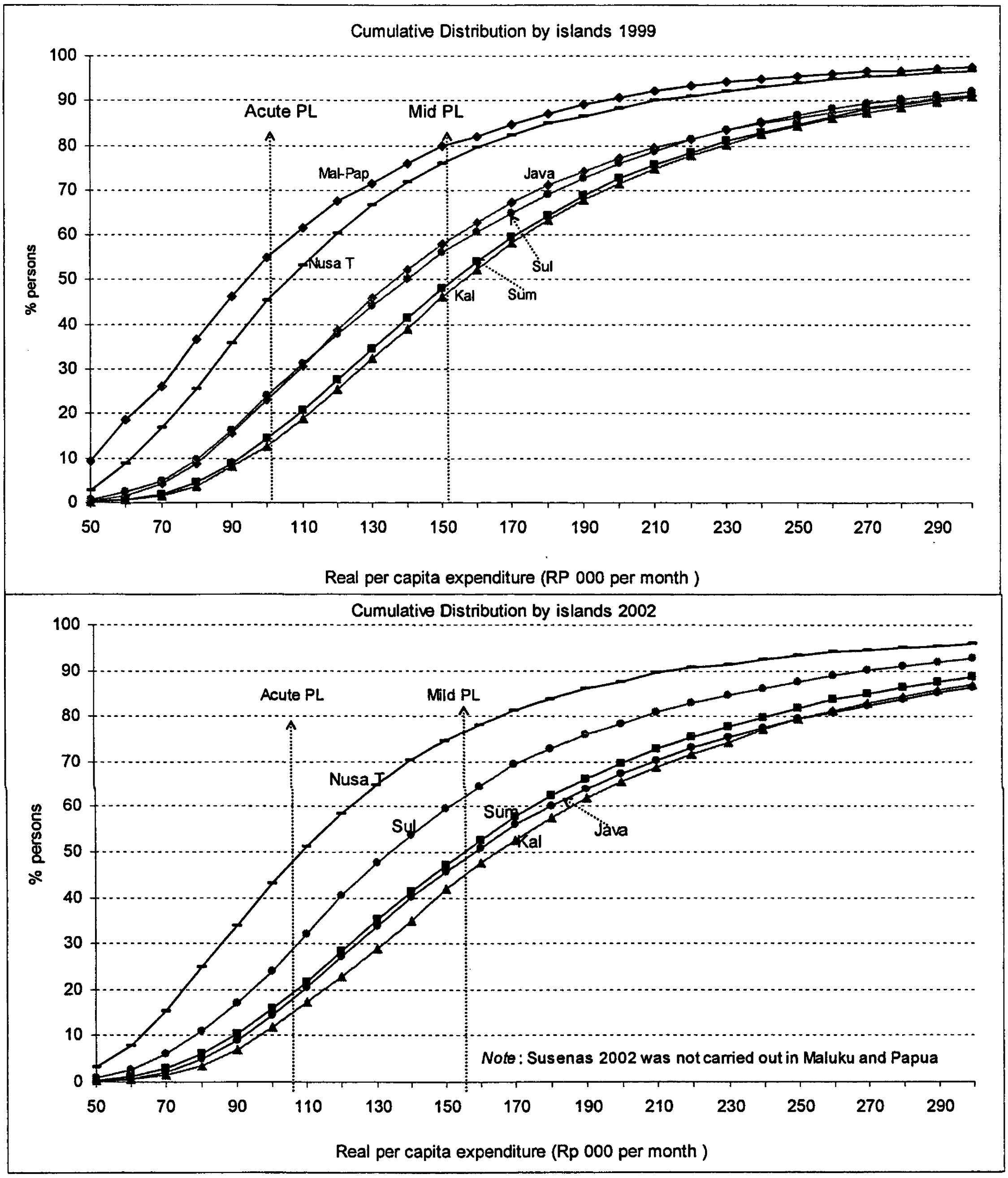
Figure A7.6b: Cumulative distribution of poverty by islands in 1993 and 1996



Notes: Real expenditure is estimated as in notes for Figure 7.1 in the main text.

Source: Author's estimates

Figure A7.6c: Cumulative distribution of poverty by islands in 1999 and 2002



Notes: Real expenditure is estimated as in notes for Figure 7.1 in the main text.

Source: Author's estimates

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Chapter 8

Summary and Conclusions

8.1. Problems and approaches

No previous studies have used a single method for estimating poverty incidence in Indonesia over the fifteen years between 1987 and 2002. The official BPS estimates are based on five different methods and other researchers have estimated poverty for single year, or only for a pair of adjacent years (1996 and 1999 in Pradhan et al, 2000). As a result, it has not previously been possible to have reliable estimates of the extent of the long-term decline in Indonesian poverty. This thesis investigates the *direction* and the *magnitude* of the change in poverty incidence during that period. In addition, the problems with the official poverty lines are not only that they are incomparable across provinces, but also that they are assume an excessive gaps of urban poverty lines over rural poverty lines. Moreover, the alternative method (i.e., the Ravallion lower and upper poverty line) does not entirely resolve the problem, because this method is an ad hoc solution for the absence of regional non-food price data. The Ravallion method also suffers from inconsistency both across regions and over time.

This thesis applies not only one single method to estimating the poverty incidence during that period, but also applies an approach that estimates poverty lines in all regions and years generating a constant utility level. This is the utility consistent poverty line (UCPL) approach. The idea of this approach begins with the concept that a poverty line is one point of an expenditure function. Therefore, the difference between a poverty line in one region and any other regions or years should be measured through the ratio of two expenditure functions in the two regions or years evaluated at two different price sets, but holding utility constant. The ratio of the two expenditure functions by definition is a true cost of living index and for practical purposes is best approached (through a linear approximation) by a Laspeyres price index. Accordingly, the poverty line for each region (urban and rural areas in each province) in each Susenas year (1987, 1990, ..., 2002) was estimated by constructing a spatial cost of living index (SCOLI) with an average for rural Indonesia in 2002 as the base region and year.

The author carried out a special regional price survey to collect the prices of 31 food items and 18 non-food items (49 items in total), including the rental cost of typical houses for low-income people. The survey was carried out in traditional markets in the urban and rural areas of ten selected provinces, where almost 75 per cent of Indonesian poor lived in 2002 based on the official estimates. These ten provinces were also chosen because the time-series of rural prices were reported by BPS. Based on these prices, the SCOLI was estimated for the ten selected provinces for 2002. The SCOLI for other non-surveyed provinces was approached by the SCOLI of the most similar surveyed provinces with adjustment for differences in *urban food prices* as reported by BPS. The SCOLI for each earlier Susenas year was estimated through backcasting the 2002 SCOLI using the BPS reported prices.

The SCOLI was then transformed into a poverty line by a single scaling-factor. Note that the chosen level of utility in the expenditure function (poverty line) is arbitrary, but once a utility level has been picked, it has to be fixed across domain comparisons. This thesis picks two levels of utility, namely a lower level of utility - $\underline{u}$ -, which corresponds to an acute poverty line; and an upper level of utility - $\bar{u}$, which corresponds to a mild poverty line. The acute poverty line is set by choosing the scaling-factor to generate a poverty incidence in 2002 as close as possible to the official estimate. The mild poverty line is set at 50 per cent higher than the acute poverty line.

8.2. The direction of the changes in poverty

Long-term trend: The long-term trend in poverty incidence during the 15 years from 1987 to 2002 has definitely decreased. The application of a single and consistent method of poverty measurement in this thesis resolves the issue of the trend in poverty incidence during that period. This method shows poverty incidence in 1987 was higher than poverty incidence in 2002. This conclusion is robust for all possible levels of poverty lines used in the measurement.

Pre-crisis period: Poverty incidence had steadily decreased from 1987 to 1996. Three estimates of poverty incidence were made by three different studies, namely Bidani and Ravallion (1993) for 1990, Ikhsan (1999) for 1993, and Pradhan et al (2000) for 1996. It was not clear from these studies whether the poverty incidence from 1990 to 1996 diminished steadily or with a fluctuation. This thesis finds that poverty incidence steadily and substantially diminished between 1987 and 1996. For every possible level of poverty line used in the measurement, poverty incidence in 1996 was far below poverty incidence in 1987.

Crisis period and afterwards: The 1997 crisis broke down the Indonesian success story in poverty alleviation that had been achieved in previous periods. It put the 1999 poverty incidence in Indonesia back to the level of 1990, or at least to a level sometime before 1993. For every possible level of poverty line used in the measurement, poverty incidence in 1999 was almost the same as poverty incidence in 1990. Worse, poverty incidence could have been even higher than the 1990 level. For every possible level of poverty line set at Rp 140 thousand per capita/month or below, the poverty incidence in 1999 would have been almost the same as poverty incidence in 1990. However, if the poverty line had been set above that level, poverty incidence in 1999 would have been even higher than in 1990. Even though this is sensitive to the SCOLI used in the estimation of real expenditure, it can still be concluded that poverty incidence in 1999 was always above poverty incidence in 1993 for every possible level of poverty line used.

By 2002, poverty had declined from the 1990 level. However, in contrast to the officially estimated poverty incidence, which suggested that by 2002 poverty incidence had returned to the 1996 level, this thesis demonstrates that, despite the decline between 1999 and 2002, poverty in 2002 was still well above that in 1996. This conclusion is robust whatever SCOLI used in the estimation of poverty lines.

8.3. The change in acute and mild poverty incidence

Acute poverty incidence Vs official estimate: The UCPL approach demonstrates the official estimates of poverty incidence underestimate the declining rate during the pre-crisis period and also underestimate the rising rate during the crisis period. Between

1987 and 1996 (pre-crisis period), the acute poverty incidence had steadily declined from 27.0 per cent of the total population in 1987 to only 12.4 per cent in 1996. This is more than half, but the 'consistent' official estimates only declined from 26.7 per cent in 1987 to 17.5 per cent in 1996, or roughly one third. Moreover, between 1996 and 1999 the acute poverty incidence almost doubled from 12.4 per cent to 23.0 per cent but the 'consistent' official method shows poverty incidence increased by less than half from 17.1 per cent to 23.0 per cent.

The big discrepancy between the official estimates and the UCPL estimates was poverty incidence in 1996 and was mostly in the three most populous islands: Java, Bali, and Sumatra. This discrepancy was because the inflation rate used in the UCPL approach, which raised the poverty line between 1996 and 1999, was much higher than the inflation rate implied by the official poverty line. The inflation rate used in the UCPL approach was 155 per cent, whereas the official figure was only 120 per cent. Observing the increase in selected individual prices that have a large share in the consumption pattern of the poor, such as rice, fish, cigarettes, and house materials, it is most likely that the 'true' inflation between the two years was much higher than the rate implied by the official poverty line.

With regard to the doubling of acute poverty in the crisis period, households living in urban areas or working in non-agricultural sectors were severely hit by the crisis. Poverty in urban areas was taken by the crisis to the level before 1987 with poverty incidence in 1999 higher than the 1987 level. Likewise, households living in Western Indonesia, in which the domination of non-agricultural sectors was higher than in

Eastern Indonesia, were severely hit by the crisis. This is consistent with the finding that poverty incidence in non-agricultural sectors increased more than in the agricultural sector. This is not surprising since the sectoral impact of the crisis was also uneven, with the negative impact on the agricultural sector being the least.

Acute Vs mild poverty: The long-term and short-term trends in mild poverty incidence were similar to those for acute poverty incidence, but the short-term fluctuations were not as sharp as for acute poverty. Even though the mild poverty line is set at only 50 per cent higher than the acute poverty line, the mild poverty incidence in every Susenas year was higher by far more than 50 per cent. For example, the acute poverty incidence in 1987 was 27 per cent, while mild poverty incidence was 59.5 per cent. Short-term fluctuations in mild poverty were not as sharp as in acute poverty. During the pre-crisis period mild poverty fell to 41.1 per cent in 1996 before jumping during the crisis to 57.1 per cent. This jump is far below a half. Between 1999 and 2002 mild poverty then fell to 47.7 per cent.

8.4. Relative poverty: a misleading indicator

Relative poverty cannot be used as an indicator for monitoring poverty incidence over time. As mentioned, acute poverty (which is absolute poverty) steadily and markedly declined from 1987 to 1996, sharply rose by 1999, and had declined again by 2002. In contrast, relative poverty incidences were roughly constant over time with a small fluctuation. Yet, their fluctuation patterns were in contrast with the patterns in absolute poverty. The fluctuation of relative poverty during 1987 and 2002 has been exactly the same as the fluctuation of the Gini coefficients. Both arrived at the maximum level in 1996 and dropped to their lowest point in 1999. Relative poverty is a measure of inequality rather than a measure of poverty incidence.

8.5. Distribution of the poor

Across urban-rural areas: Poverty in Indonesia has always been concentrated in rural areas. This is closely related to the finding of the urban-rural cost of living gap (U-R COL gap) in this study, which was 13 per cent (Chapter 4), and which was more or less consistent with other non-official studies. Accordingly, there has not been a shift in the concentration of poverty incidence from urban to rural areas in the early 1990s as is implied by the official estimate. This is in line with the proportion of population living in rural areas dominating the total population and poverty incidence in urban areas has always been much smaller than in rural areas. Such a shift in poverty incidence never took place.

The proportion of urban poor to total Indonesian poor has doubled in 2002 compared with 1987. It was 11 per cent in 1987 and 23 per cent in 2002 (which was far below the official estimates of 32 per cent in 2002). The doubling in the proportion of urban poor was mainly a reflection of the doubling in the proportion of urban population to total population.

Across islands/provinces: Poverty incidence has been consistently highest in the Eastern Indonesian islands of Nusa Tenggara, Maluku, and Papua, followed by Sulawesi. This feature holds for the 15 years period of analysis, with the exceptions of 1999, when Java was the third highest poverty incidence island, and 1987, when acute poverty in

Sulawesi and Kalimantan were at the roughly same levels.

Provinces have been ranked in Chapter 7 by acute poverty incidence for each Susenas year. The ranking of provinces by poverty incidence in 1987 was not much different to the ranking in 2002. This is more or less consistent with the provincial economic growth story that regions at the top and bottom of the distribution in 1983 remained at the same position as in 1993.

Decomposition of the change in acute poverty: The contribution of rural areas to the decline in Indonesia's total poor was large. This is not surprising since the largest percentage of poor live in rural areas. In addition, the share of rural population to the total Indonesian population was also substantially higher although the rural population share had declined to only 56 per cent by 2002.

The population shift (i.e., the declining share of population residing in rural areas) contributed positively to the decline in poverty. The highest contribution in the reduction of acute poverty was 19 per cent, which was between 1987 and 1990. As poverty incidence is highest in rural areas, the population shift always reduces the national poverty incidence. When the poverty incidence rose sharply in the crisis period, the contribution of the population shift was to lessen the jump by 3.6 per cent of the total change.

The decomposition by islands shows the contribution of declining (increasing) poverty incidence in Java and Bali, as well as in Sumatra, has been large. The contribution of Java and Bali to Indonesia's total poverty decline from 1987 to 1990 was 44 per cent, followed by Sumatra with 16 per cent. In the crisis period, the contribution of Java and Bali as well as Sumatra to the total jump was 74 per cent and 13 per cent. This pattern is not surprising, since these islands are the most populated in Indonesia.

8.6. The Ravallion method

This thesis finds in practice that the Ravallion lower poverty lines (LPL) and upper poverty lines (UPL) have an upward bias in regions with relatively high food prices. Every increase in the relative price of food to non-food by 1 per cent leads to a positive 0.25 per cent bias in the LPL and 0.19 per cent in the UPL. On average, these biases lead to a 2-3 percentage points upwards deviation in poverty incidence from the estimates using the UCPL approach in regions with high food prices relative to non-food prices. Conversely, these biases lead to a 2 percentage points downwards deviation in regions with low food prices relative to non-food prices.

The biases have little impact on the ranking of provinces by poverty incidence generated by the Ravallion method. The ranking of provinces by HCI estimated using Ravallion LPL method correlated very closely to the ranking by HCI estimated using the UCPL approach. The close correlation was found in 1990 (between the author's HCI versus the Bidani and Ravallion estimate), and also in 1996 and 1999 (the author's HCI versus the Pradhan et al estimates).

8.7. Outline for future work

Given the time and financial constraints, the 2004/05 special price survey to construct the cost of living index for 2002 had to be carried out by a single person. The main purpose of conducting this survey was to make sure the collected prices were of similar quality goods across regions. From this point of view, a one-person survey is considered to be a worthwhile approach, especially when dealing with the heterogeneity in the quality of houses and other durable goods across regions. This is the first attempt to construct a regional price index including urban and rural areas in Indonesia.

Nevertheless, the chosen location of traditional markets in both urban and rural areas could be carried out in a more systematic way. To capture the prices in each urban and rural area, prices could be taken from several districts and in each of districts from several traditional markets. All provinces could be covered. In addition, within each traditional market, the price of one good could be collected from several kiosks.

To have a more comprehensive price survey of this kind with an emphasis on spatial comparability is a big task requiring the involvement of an official statistical agency. This thesis has shown that a comprehensive survey of regional prices is needed if reliable estimates of poverty are to be obtained.

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